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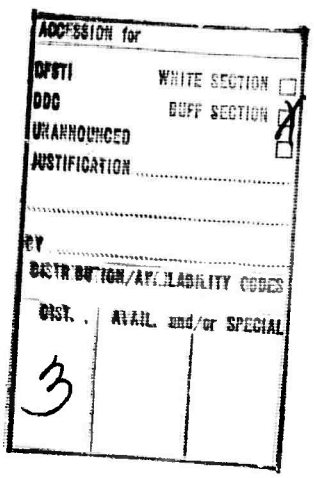
SPRAY TEST CALIBRATION OF THE HIDAL (HUS-1 or H-34)

This work was prepared under OSD/ARPA Order 256, Amendment 4.

J. W. Brown, U.S.A. CmlC

July 1962



(6) SPRAY TEST CALIBRATION OF THE HIDAL (HUS-1 or H-34),

A joint report by personnel of USDA, USAF and USA CmlC of work performed under OSD/ ARPA Order 256-62, Amendment 4.

(10) James W. Brown, USA CmlC

(15) ARPA Order 256-4

(11) July 1962,

(12) 86p.

Eglin Air Force Base Florida

1473

CONTENTS

APPENDICES

I. BACKGROUND

The HIDAL (Appendix A) has been used successfully within the past year on an H-34 helicopter to spray herbicidal materials (references 2 and 3, Test 1). It had not been previously calibrated for this purpose. Verbal approval of OSD/ARPA (reference 1 (Appendix B)) was obtained on 26 June 1962 to obtain performance data on this equipment. Attempts to modify the equipment were not intended. It was of immediate interest to determine flow rates, swath widths, particle size (mmd), and levels of deposit with three solutions of various viscosities, each at spray altitudes of 50, 75, and 100 feet. The solutions used were: (1) purple, (2) a mix of 2 parts fuel oil and 1 part purple, and (3) fuel oil, in that order.

In the use of the HIDAL it has been recommended that only inwind flights be performed (Appendix A) and that airspeeds be held in the range of 45 to 55 knots.

An HUS-1 helicopter (equivalent to H-34) with HIDAL aboard arrived from MCAF, New River, Jacksonville, N. C., for performance tests. On 17 July the pilot was a ground observer for the last tests performed with the first modification of the C-123 aircraft (reference 1 and Supplement) and had an orientation fly-over of the grid later in the same day.

Captain George S. Stains, USN, DVCC, Naval Air Station, Jacksonville, Florida, was alerted of the aircraft arrival on 16 July and he and Mr. L. Branson arrived 17 July. Both witnessed flights of 18 and 19 July. These tests were completed 21 July 1962. It is planned for the author to visit Captain Stains at NAS, Jacksonville, Florida, on or about 25 July to discuss performance of the equipment and the results obtained.

Subdivision of work for the HIDAL testing at Eglin AFB was as follows:

<u>Flow Rate Determinations</u>

Mr. Donald Whittam, USDA. In charge*
Mr. Glenn Hipple, Olmstead AFB*
Mr. Ken Baird, Olmstead AFB*
Mr. L. Branson, USNAS**

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* Departed Eglin AFB 20 July
** Departed Eglin AFB 22 July

Grid Operations

Mr. L. W. Boyer, CmlC. In charge
Mr. C. Boyles, CmlC
Lt. C. Fuller, CmlC
Lt. P. Wampner, CmlC*
Captain R. W. Weaver, Eglin AFB
and CmlC enlisted personnel from Fort McClellan

Data Processing

Mr. W. B. Johnson, CmlC. In charge
Lt. C. Francis, CmlC

Spray Flights

1st Lt. W. W. Moore, USMC, 074593, In charge
2d Lt. A. Palatini, USMC, 082942
(H&MS 26, Sub Unit 1
MCAF, New River
Jacksonville, N. C.)

Report Preparation

Dr. J. W. Brown
Mrs. B. O. McCollough

* Departed Eglin AFB 19 July

II. CALIBRATION METHODS AND RESULTS

The methods used for calibration have been described elsewhere (reference 1). Exceptions are noted below.

A. Flow Rate

The HIDAL equipment was functioned on the ground and the three solutions recovered in troughs draining into half-drums. A calibrated dipstick was used to measure the drained amounts sprayed in a given period.

It was found that all three solutions were sprayed at the same rate, namely, 24 gallons per minute. The motor, electrically powered, appears capable of driving a positive displacement pump at a constant speed, despite differing viscosities of the solutions used. Pressures observed varied as follows:

Solution	Pump Pressure (psi)
Purple	34
Mix	32
Fuel Oil	31

B. Sampling Grid Operation

The 50 knot aircraft speed requested for all flights, combined with altitudes of 50, 75, and 100 feet, required a more exact aiming of the aircraft across given stations of the sample line. To provide this exactness, helium-filled balloons* on tethers approximately 10 feet long were set out opposite desired crossing points.

Because of the lower altitudes at which the tests were conducted, the weight-lifting capacity of the aircraft (HUS-1, equivalent to the H-34), the possible period of daily operation, the chemical and fuel loads, and the varying meteorological conditions encountered at the grid and in transit, flights were planned in pairs across the same sampling set-up. For instance, once a sample line had been prepared, one spray pass was called for across station 75 and then another across station 25 with the same altitude and heading. These passes were usually accomplished within 3 to 5 minutes. An 8-minute period was allowed for the spray to settle prior to picking up and setting out cards for the next pair of runs. In the meantime the aircraft could land within 200 yards of the controller's station, well away from the sampling grid, and wait for the servicing of the sample line. Usually, three sets of two passes each were accomplished before returning the aircraft for refueling.

A total of 40 spray flights were accomplished in the period 18-21 July.

* White-colored balloons were preferred by the pilot for both dawn and daylight flights.

C. Particle Size

All flights were attempted inwind; however, shifts in wind direction were sufficient to provide adequate separation of drops for approximate particle size determinations (mmd) for each solution (reference Appendix B).

Solution	MMD (microns)
Purple	348
Mix	265 - 273
Fuel Oil	235 - 265

D. Swath Widths

The following table has been prepared from the data presented in Appendix B.

Solution	Spray Alt (ft)	No. Of Flights		Total Swath (ft)	Swath Width for Approximate Gallons Per Acre Rates (ft) 0.5 GPA	1.0 GPA	1.5 GPA
Purple	100	5	Max:	880	320	160	120
			Min:	440	160	20	0
			$\bar{X}$:	588	248	108	44
Purple	75	5	Max:	1020	440	280	140
			Min:	440	220	100	20
			$\bar{X}$:	724	304	160	80
Purple	50	4	Max:	500	240	140	120
			Min:	320	220	120	20
			$\bar{X}$:	415	225	135	85
Mix	100	4	Max:	1100	360	160	20
			Min:	460	200	20	0
			$\bar{X}$:	640	245	115	5
Mix	75	4	Max:	560	320	180	20
			Min:	500	180	40	0
			$\bar{X}$:	530	240	130	5
Mix	50	4	Max:	980	340	180	20
			Min:	520	220	20	0
			$\bar{X}$:	655	265	125	5
Fuel Oil	100	4	Max:	620	240	0	0
			Min:	520	180	0	0
			$\bar{X}$:	580	210	0	0
Fuel Oil	75	2	Max:	680	240	20	0
			Min:	560	200	0	0
			$\bar{X}$:	620	220	10	0
Fuel Oil	50	2	Max:	560	180	40	0
			Min:	540	180	20	0
			$\bar{X}$:	550	180	30	0
Fuel Oil*	100	2	Max:	540	200	0	0
			Min:	240	120	0	0
			$\bar{X}$:	390	160	0	0
Fuel Oil*	75	2	Max:	660	200	0	0
			Min:	460	60	0	0
			$\bar{X}$:	560	130	0	0
Fuel Oil*	50	2	Max:	720	220	0	0
			Min:	420	180	0	0
			$\bar{X}$:	570	200	0	0

* Intentionally flown 1100-1230, 20 July with a strong lapse condition existing and temperatures near 86° F.

III. DISCUSSION

Although there appear to be inherent characteristics of sprays delivered by helicopter vs fixed wing aircraft, the sprays delivered by helicopter have been demonstrated elsewhere (references 2, 3 and 4) to be effective.

Helicopters can operate safely at lower altitudes and airspeeds; however, reduced payload (200 gallons or less), and relatively fixed delivery rates of the HIDAL have been found. It also seems that maintenance requirements of the aircraft are relatively frequent.

Because of the lower altitudes and airspeeds of these aircraft, and perhaps of the air blast of the main rotor downward, a better control of aimability of spray may be experienced. It appears that the main rotor influence is sufficient to overcome to a degree the influence of gentle and variable winds. Several flights performed in these tests gave evidence of deposit that resemble a classic bi-modal curve wherein the trough or valley was readily apparent but not severely pronounced.

During inwind flight under inversion conditions directly away from an observation point, much of the spray was observed to be influenced by vortices created by the main rotor. This phenomenon usually can be expected to even out the level of deposit in effective swath widths. It is conjectured, however, that under the conditions obtaining (low altitude, low air speed, inwind, inversion with low wind velocities) and where the mmd of the spray and its density were relatively high, a relatively rapid fallout occurred. As the density of the spray material diminished to that of fuel oil, it appears that levels of deposit and mmd decreased somewhat.

Except for the first spray flights on 18 July, all other flights were well executed. The first flight was performed at about 100 feet altitude over station 50, and a total swath of about 440 feet was obtained. Because the line was 2000 ft long it was decided to combine flights to pass centrally over each 1000 ft of the same line. The second flight performed at about 75 ft altitude resulted in two spray passes over station 50 on the same set of cards.

At Captain Stains suggestion some releases of fuel oil were made on 20 July (after an abort because of thunderstorms at about 1300 to 1400 hours on 19 July) during a lapse condition. Wind velocities were quite high and essentially precluded the use of purple because of potential damage to valuable vegetation. These releases, although indicating a lower level of deposit, averaged total swaths comparable to or a little less than swaths flown 21 July with fuel oil under inversion conditions.

Meteorological information is essential for a proper evaluation of the data, (particularly wind directions influencing the spray during its fall). The wind direction data is perhaps the least reliable, not only for this report but for a previous one (reference 1). Instrumentation to give more exact directional data at low altitudes (25 to 200 ft at desired intervals) using a tethered balloon is highly desirable but unavailable. Tower instruments are known but a balloon is desirable because it can be lowered should the prevailing winds indicate a flight in its vicinity. A fixed tower for the sake of safety would have to be further removed from the sampling area.

Since a "fix" for the HIDAL was obtained in the past year it appears that flight tests would be in order to determine new and perhaps greater safe airspeeds. The pilot reported that in his opinion the HIDAL could be flown safely at 70 knots. If higher airspeeds are possible, greater flow rates would also be indicated for use in connection with the increased airspeeds.

The sequence of materials sprayed was intentionally planned to leave the system as uncontaminated of purple code material as possible under the circumstances. It is suggested that the nozzles be removed, disassembled, submerged and rinsed in a suitable solvent (gasoline, acetone or the like) prior to use for insecticide purposes. The tank and booms can be flushed again with fuel oil as a precautionary measure.

In regard to aircraft and other vehicles exposed to sprays of the purple code material, it is suggested that in a large measure heroic efforts to remove the chemical have contributed to observations by others that any deleterious effect was caused by the chemical. Effects of this kind should be objectively appraised. Areas of investigation should include, effects on various metal alloys, plastics, paints, various rubber compositions, etc. Until studies of this kind are made prejudice and superstition are likely to prevail.

IV. CONCLUSIONS

A. The data reported herein are uncorrected and should be corrected prior to evaluation by others skilled in the necessary arts.

B. The HIDAL performance is generally indicative of a useful system to spray the solutions tested. It appears that the system is capable of delivering about 1 gallon per acre of purple code material in a swath of 100 to 150 ft over open terrain. This swath width is likely to decrease somewhat if releases are made over a forest.

C. The unevaluated data are probably representative of what can be expected performance-wise under operational conditions comparable to those prevailing during these tests.

V. RECOMMENDATIONS

It is recommended that:

1. Certain materials including about 27 drums of purple code material and 10 drums of mix (2 parts fuel oil-1 part purple) and other items necessary for the maintenance and operation of the sampling grid be stored under appropriate conditions at Eglin AFB pending the arrival of the second modification of an MC-1/C-123 system for testing.

2. Captain George S. Stains, USN, DVCC, NAS, Jacksonville, Florida, be provided with an evaluated report as soon as it becomes available so that any further desirable testing can be planned for this system immediately subsequent to tests with the second modification in 1 above.

3. The HIDAL/H-34 system continue to be used in situations where 1 gallon per acre or less of purple code material is indicated and the system capacity is not restrictive.

4. Decontamination procedures be developed and tested for adequacy for those systems which have been or will be used to spray purple code material, either in concentrated or in diluted form.

5. Teflon vanes be used in the HIDAL pumps until proven to be unsatisfactory or until a more suitable material is found.

6. A realistic appraisal of effects of the purple code material be conducted on the HUS-1 aircraft (No. 145786) used in these tests and that these findings be made known as soon as possible.

7. The HIDAL rig be test flown for greater permissible operational airspeeds. If the airspeed can be increased effort should be initiated to increase flow rates as well.

VI. REFERENCES

1. Modification and Calibration of Defoliation Equipment (C-123 - First Modification) (and Supplement).

2. Preliminary Report of Vegetational Spray Tests.

3. Vegetational Spray Tests in South Vietnam (and classified Supplement).

4. Review and Evaluation of ARPA/OSD "Defoliation" Program.

APPENDIX A

INSTRUCTIONS FOR THE OPERATION OF HIDAL

UNITED STATES NAVY
DISEASE VECTOR CONTROL CENTER
U. S. NAVAL AIR STATION
JACKSONVILLE 12, FLORIDA

INSTRUCTIONS FOR THE OPERATION OF HIDAL

INTRODUCTION

The Navy's need for insecticide dispersal equipment for use on rotor wing type aircraft has been evident for several years. A few of the helicopter manufacturing companies have produced dispersal apparatus for their own aircraft; however, such equipment required varying amounts of alteration to the helicopter and resulted in too much time for mounting and dismounting.

The Navy and Marine Corps, and this is also true for the other branches of the Armed Forces, have a progressively fewer number of propeller-driven fixed wing type of aircraft that are capable of accommodating presently available aerial dispersal equipment. Jet aircraft are extremely limited in their ability to disperse insecticide because of their tremendous speed, poor maneuverability, and the high altitudes at which they must operate. Therefore the helicopter is the only remaining aircraft which is suitable and available in quantity for aerial dispersal operations.

The principle objectives in developing insecticide dispersal equipment for the helicopter were as follows: (1) to have available a versatile spraying apparatus that could be mounted on most of the larger types of Navy and Marine Corps helicopters; (2) to design the equipment so that it could be mounted and dismounted with a minimum of time and effort, and require as little modification to the aircraft fuselage as possible; (3) construct the equipment as light in weight as possible, without sacrificing rigidity and strength, and thereby achieving the maximum pay load; (4) utilize standard stock items for parts that would most likely need repair or replacement; and (5) make the equipment so that it would be economical to contruct and maintain and simple to operate.

Before any serious consideration is given to the use of this equipment for aerial dispersal operations the following instructions and technical publication should be used as guidelines:

1. OPNAVINST 6250.2A (being revised) "Dispersal of Insecticide by Aircraft".
2. SECNAVINST 6250.1 "Pest Control in civilian communities, policy concerning assistance of".
3. BUMEDINST 6250.3 "Insecticides, Precautions and Use of".
4. NavMed P-5010-11, The Proper Handling of Navy Standard Pesticides.

A. The Dispersal Unit.

HIDAL (Helicopter, Insecticide, Dispersal Apparatus, Liquid) consists of a pair of spray booms extending out some 25 feet, on on each side of the helicopter fuselage in a delta design. The pumping unit is operated by a motor which receives power from the helicopter electrical system. A 200 gallon fiber glass non-corrosive cylindrical tank mounted inside the cabin comprise the reservoir for the insecticide. The insecticide is discharged from the boom through a series of tee-jet brand diaphragm type nozzles and is distributed over a wide area by the helicopter rotor blade turbulence.

B. Insecticide Solution to be Used.

1. A 20 per cent solution of DDT in fuel oil (Standard Stock No. GM6840-291-3462) is recommended for use in the HIDAL provided there is no proven insect resistance to this insecticide. In the event there is resistance, the recommendations of an entomologist are essential. Insecticide concentrates other than 20 per cent DDT aerial spray may be used. However, they must be in oil solutions. Insecticide solutions should be of sufficient concentration so that a deposit rate as low as one-half pint per acre will produce kill.

2. When possible, those using HIDAL should work with and be guided by the advice of a member of the Medical Department qualified in entomology or vector control.

3. Only oil solutions of insecticides can be used in this equipment. This is required because the pumping unit is lubricated by the solution it pumps.

4. Safety precautions should be observed at all times when handling insecticides (see instructions in enclosed NavMed P-5010-11, "The Proper Handling of Navy Standard Pesticides").

C. Filling Reservoir.

1. Remove reservoir filler cap and place funnel equipped with fine mesh screen in position.

2. Fill the 200-gallon reservoir to capacity or to level approved by the aircraft commander. Standard Stock 20 per cent DDT insecticide weighs approximately 8 pounds per gallon. The insecticide level in the fiber glass tank can be easily seen through the tank wall.

3. A convenient and rapid method of filling the reservoir is by using a barrel type hand crank oil transfer pump (Tokheim high vacuum hand pump, Model 688 Series, Ft. Wayne, Indiana Factory Branch, 475 Ninth Street, San Francisco, California). This unit is for field use in transferring oil solvents from barrels.

4. After filling reservoir make certain that filter cap is securely in place.

5. Every effort should be made to prevent spillage of the insecticide in the cabin of the aircraft.

D. Ground Check.

1. Check all hose connections and pipe fittings for leaks.

2. Check electrical connections for tightness and determine if operating switch is properly mounted in pilot's compartment.

3. Make certain that ground wire from pump unit is properly grounded to aircraft frame.

4. Check individual nozzles for correctness of alignment and tightness of fit.

5. With pilot in aircraft compartment, activate spray switch for sufficient period to determine if each nozzle is functioning properly. Approximately ten seconds pumping time will be required to fill the booms and before the nozzles will begin spraying.

6. Observe pump pressure gauge. The proper pump pressure should read about 40 psi with all nozzles spraying.

7. Turn motor unit on and off several times and check nozzles and other boom fittings for leaks.

E. Flight Recommendations.

1. Altitude of release.

a. HIDAL should be operated between 75 and 100 feet altitude. Over dense foliage it may be necessary to fly at lower altitudes in order to obtain maximum penetration of spray. Spraying over open terrain an effective swath (killing swath) of 300 or more feet may be expected at 75 to 100 foot altitude. It should be noted that lower altitudes will result in considerably reduced swath widths. Altitudes in excess of 125 feet are not recommended. because of the wide and ineffective dispersal of the insecticide.

b. Indicated air speed.

Recommended operational speed is 50 to 55 knots for the HUS type helicopter. Speeds higher than 55 knots will result in an undesirable decreased insecticide deposit rate and diminish the down draft effect of the rotor blades. Speeds less than 45 knots are not recommended due to loss of translational lift. At the recommended speeds the deposit rate is between 1-1/2 and 2 quarts of insecticide per acre.

c. Wind velocity.

Operations are not recommended in winds above 10 knots. Wind velocity below 5 knots is the most desirable.

c. Line of flight.

When possible all flight operations should be made into the wind. Downwind and crosswind flights may result in considerable contamination to the aircraft. The equipment should never be operated with the aircraft in a "hovering" position. This results in undue contamination to the aircraft and endangers flight personnel.

e. Distance which may be expected between lines of flight (swath width).

(1) Open type terrain: 300 feet

(2) Light or intermittent canopy: 200 feet

(3) Heavy canopy: 100 feet

It should be noted that the above distances are only approximates and many conditions can alter them.

f. Time of day for spraying.

(1) Ground turbulence.

(a) Spraying is most effectively controlled when the air near the ground is moving downward or when there are no detectable vertical drafts. Updrafts (turbulence), increase during the day as the sun warms the terrain and often are considerable by mid-afternoon. This tends to float the spray, especially the small droplets, and downward progress of the insecticidal cloud is delayed. If significant winds are present, the insecticide may drift entirely out of the target area resulting in unpredictable and erratic deposit of the spray.

(b) Spraying is therefore best done in the early morning near sunrise or late evening when the ground temperatures are cool.

(c) When the temperature of the air six to eight feet above the ground is at least one degree warmer than the temperature six inches from the ground, best results are achieved.

E. Special Precautions.

1. The after fuel tank of the helicopter should be left empty whenever possible. This is to compensate for C-G.

2. Never operate the insecticide fuel pumps without solution.

3. For each 1,000 gallons of insecticide dispensed the master filter and filters in each nozzle should be removed and cleaned. The nozzle tips should always be adjusted so that the nozzle slit opening and the flat spray pattern are parallel to the boom. Each nozzle is equipped with an individual diaphram type check valve which is designed to open at 5-7 pounds pressure. Sometimes dirt may cause these valves to "leak" and results in nozzle dripping.

4. Use only an oil type insecticide solution in HIDAL equipment. Never under any circumstances, use an emulsion, suspension, or wettable powder solution.

5. The booms should be handled with extreme care in order that the delicate nozzles will not become damaged or broken.

F. Nozzles.

1. The nozzles used with HIDAL are a special "tee-jet" brand especially adapted for aerial dispersal of insecticides. A Spraying Systems Company catalog furnished with each unit, describes the nozzle and its components in detail. The nozzles have been assembled on the boom at the time of shipping, and only need to be checked for tightness of fit when the boom is removed from the shipping case. DO NOT THROW AWAY THE SHIPPING CASE, because it has been especially provided for transporting and storing the HIDAL booms.

2. Nozzle description.

The nozzles furnished with this equipment are No. 4664 diaphragm "tee-jet" brand. The tip furnished with each nozzle is a Spraying Systems No. 8006, which delivers a flat spray pattern (80°) at a flow rate of 0.6 gpm at 40 psi. All component parts of the nozzle may be purchased separately from the Spraying Systems Company, Bellwood, Illinois, in the event that they are lost or damaged. Tips which provide different flow rates and spray patterns may also be obtained for this nozzle. Eight spare nozzles and 15 blank plugs are furnished with each HIDAL kit.

3. Nozzle spacing along the boom.

The nozzle openings on the boom are numbered 1 through 34, beginning with the inboard section. Under most conditions, numbers 1 through 4 are plugged. This is to reduce contamination to the aircraft fuselage. The recommended nozzle arrangement is as follows:

1 - 4	Inclusive	Plug	14	Plug
5		Nozzle	15	Nozzle
6		Plug	16	Plug
7		Nozzle	17	Nozzle
8		Plug	18	Plug
9		Nozzle	19	Nozzle
10		Plug	20	Plug
11		Nozzle	21	Nozzle
12		Plug	22	Plug
13		Nozzle	23 - 24	Nozzles

4. Nozzle adjustment.

The nozzle is in the correct position when its length is at right angles to the boom proper. The tip should be adjusted so that the slotted portion is parallel to the boom. No adjustment is necessary to the diaphragm end of the nozzle except to be sure that the retainer is tightly locked by the spring clip.

APPENDIX B

BASIC DATA

CONSOLIDATED SUMMARY

Swath Widths* and Estimated % of Mass in Each Swath

File No.	Flt. No.	Date	Alt. (ft)	Spray Material	Total Swath (ft)	0.5 GPA Ft	0.5 GPA % Mass	1.0 GPA Ft	1.0 GPA % Mass	1.5 GPA Ft	1.5 GPA % Mass	% Recovery	MMD
H-1	1	18 Jul 62	100	Purple	440	260	91.1	160	68.9	0	-	135.2	-
2	2	"	75	"	1020	440	93.9	280	76.7	140	49.5	126.7	-
H-3	1	19 Jul 62	100	Purple	660	320	77.5	20	6.2	0	-	126.9	-
4	2	"	100	"	880	280	85.0	100	43.8	20	13.7	121.3	348
5	3	"	75	"	520	280	98.6	160	75.7	120	62.7	140.2	-
6	4	"	75	"	540	220	84.6	120	65.8	100	56.4	116.9	-
7	5	"	50	"	420	240	97.1	140	73.5	120	64.5	135.6	-
8	6	"	50	"	420	220	89.9	120	64.6	100	55.3	129.5	-
9	7	"	100	"	520	280	93.3	160	78.8	120	62.9	140.1	-
10	8	"	100	"	440	160	84.9	100	64.5	80	55.0	123.1	-
11	9	"	75	"	660	320	91.1	140	59.2	20	17.7	163.8	-
12	10	"	75	"	880	260	85.0	100	52.1	20	19.3	146.4	-
13	11	"	50	"	320	220	96.1	140	75.1	100	56.8	138.2	-
14	12	"	50	"	500	220	87.1	140	64.3	20	13.3	126.6	-
H-15	1	20 Jul 62	100	2 Fuel Oil	460	200	83.7	140	68.1	20	11.7	123.7	-
16	2	"	100	& 1 Purple	480	200	86.6	140	68.3	0	-	107.6	273
17	3	"	75	"	500	240	90.0	180	72.0	0	-	109.4	-
18	4	"	75	"	540	180	93.5	140	77.6	20	14.9	82.5	-
19	5	"	50	"	540	260	93.9	140	61.3	0	-	101.9	-
20	6	"	50	"	580	240	86.1	160	64.6	0	-	113.1	-
21	7	"	100	"	520	220	86.4	160	66.3	0	-	-	-
22	8	"	100	"	1100	360	86.0	20	6.5	0	-	-	200
23	9	"	75	"	560	220	88.3	40	19.2	0	-	110.7	-
24	10	"	75	"	520	320	85.0	160	53.9	0	-	161.7	-
25	11	"	50	"	980	340	84.6	160	58.8	20	10.7	183.3	-
26	12	"	50	"	520	220	84.5	20	11.8	0	-	98.1	-
H-27	1	20 Jul 62**	100	Fuel Oil	240	120	77.2	0	-	0	-	51.8	-
28	2	"	100	"	540	200	75.5	0	-	0	-	92.8	-
29	3	"	75	"	460	200	77.3	0	-	0	-	72.6	-
30	4	"	75	"	660	60	32.5	0	-	0	-	68.4	-
31	5	"	50	"	420	180	79.4	0	-	0	-	82.3	-
32	6	"	50	"	720	220	81.7	0	-	0	-	79.0	-
H-33	1	21 Jul 62	100	Fuel Oil	620	240	81.4	0	-	0	-	96.4	-
34	2	"	100	"	620	220	81.8	0	-	0	-	94.9	-
35	3	"	75	"	680	240	81.3	0	-	0	-	104.0	-
36	4	"	75	"	560	200	82.1	20	9.6	0	-	90.3	-
37	5	"	50	"	560	180	73.9	40	18.5	0	-	90.7	-
38	6	"	50	"	540	180	83.8	20	10.7	0	-	78.0	-
39	7	"	100	"	560	200	87.9	0	-	0	-	78.2	235
40	8	"	100	"	520	180	81.2	0	-	0	-	79.9	265

* All flights were attempted inwind
** Mid-day flights

Helicopter H-5-1 or H-34

SPRAY NOZZLE SPACING AND DATA

Test No.: 1 Date Calibrated: 17 July Date Test Flown: 17 July

Material Used: Purple Calibrated Flow Rate: 24 GPM

Nozzle Information

Ident	Qty	Description	Location
o			
+			
Δ	42	1/4" 4664 S.S. Check valve body with 8006 Teejet tip	5, 7, 9, 11, 13, 15, 17, 19, 21, 23 thru 34

Nozzle location, same on each boom. No. 1 is most inboard position.

1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54

Δ Δ Δ Δ Δ Δ Δ Δ Δ ΔΔΔΔΔΔΔΔΔΔΔ

Engine throttle position: Electric pump

System pressure at engine; spraying: 34 psi

Length of test run: 60 seconds Gallons pumped: 24

Remarks:

B-4

Helicopter HUS-1 or H-34

SPRAY NOZZLE SPACING AND DATA

Test No.: 2 Date Calibrated: 17 July Date Test Flown: _____

Material Used: 2 parts fuel oil + 1 part Purple Calibrated Flow Rate: 24 GPM

Nozzle Information

Ident	Qty	Description	Location
o			
+			
Δ	42	1/4" 4664 S.S. Check valve body with 8006 Teejet tip	5, 7, 9, 11, 13, 15, 17, 19, 21, 23 thru 34

Nozzle location, same on each boom. No. 1 is most inboard position.

1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54

Δ Δ Δ Δ Δ Δ Δ Δ Δ ΔΔΔΔΔΔΔΔΔΔΔ

Engine throttle position: Electric pump

System pressure at engine; spraying: 32 psi

Length of test run: 60 seconds Gallons pumped: 24

Remarks:

Helicopter HUS-1 or H-34

SPRAY NOZZLE SPACING AND DATA

Test No.: 3 Date Calibrated: 17 July Date Test Flown: 20 July

Material Used: Fuel oil Calibrated Flow Rate: 24 GPM

Nozzle Information

Ident	Qty	Description	Location
o			
+			
Δ	42	1/4" 4664 SS check valve body with 8006 Teejet tip	5, 7, 9, 11, 13, 15, 17, 19, 21, 23 thru 34

Nozzle location, same on each boom. No. 1 is most inboard position.

1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54

Δ Δ Δ Δ Δ Δ Δ Δ Δ ΔΔΔΔΔΔΔΔΔΔΔΔ

Engine throttle position: Electric pump

System pressure at engine; spraying: 31 psi

Length of test run: 60 seconds Gallons pumped: 24

Remarks:

B-6

MASS DEPOSIT

MATERIAL: Purple

DATE: 18 July 1962

FLIGHT #: 1 ; Inwind

SAMPLE LINE: D

TIME OF RELEASE: 0449 hours

DURATION: 31 seconds

FLOW RATE: 24 GPM

AIRSPEED: Constant at 57.5 mph (50 knots)

ALTITUDE: 100 feet

SWATH WIDTH: 440 feet

AIRCRAFT COURSE: 45 degrees

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-37 blank		38	-	Stations 63-100 Blank			
		39	0.04				
		40	0.08				
		41	0.2				
		42	0.4				
		43	0.5				
		44	0.6				
		45	0.8				
		46	1.0				
		47	1.4				
		48	1.1				
		49	1.0				
		50	0.6				
		51	1.0				
		52	1.2				
		53	1.2				
		54	1.1				
		55	0.7				
		56	0.5				
		57	0.3				
		58	0.1				
		59	0.1				
		60	0.02				
		61	Trace				
		62	-				

% Recovery = $\frac{.202 \times 57.5 \times 13.94 \times 20}{24} = 135.2$

Total 13.94

MASS DEPOSIT

MATERIAL: Purple

AIRSPEED: Constant at 57.5 mph (50 knots)

DATE: 18 July 1962

ALTITUDE: 75 feet

FLIGHT #: 2 ; Inwind

SWATH WIDTH: 1020 Feet

SAMPLE LINE: D

AIRCRAFT COURSE: 45 degrees

TIME OF RELEASE: 0508 hours

DURATION: 13 seconds

FLOW RATE: 24 GPM

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
1	Trace	26	0.2	51	3.5		
2	"	27	0.3	52	-		
3	"	28	0.4	Stations 53-100 blank			
4	"	29	0.4				
5	"	30	0.5				
6	"	31	0.5				
7	"	32	0.5				
8	"	33	0.5				
9	"	34	0.6				
10	"	35	0.7				
11	"	36	0.7				
12	"	37	0.8				
13	"	38	1.0				
14	"	39	0.9				
15	"	40	0.9				
16	"	41	1.0				
17	"	42	1.2				
18	"	43	1.3				
19	"	44	1.3				
20	"	45	2.1				
21	0.06	46	2.0				
22	0.06	47	1.7				
23	0.08	48	1.3				
24	0.1	49	1.1				
25	0.1	50	2.1				

$$\% \text{ Recovery} = \frac{.202 \times 57.5 \times 27.9 \times 18.54}{24 \times 2} = 126.7$$

Total 27.9

MASS DEPOSIT

MATERIAL: Purple

DATE: 19 July 1962

FLIGHT #: 1 ; Inwind

SAMPLE LINE: A

TIME OF RELEASE: 0457 hours

DURATION: 20 seconds

FLOW RATE: 24 GPM

AIRSPEED: Constant at 57.5 mph (50 knots)

ALTITUDE: 100 feet

SWATH WIDTH: 660 feet

AIRCRAFT COURSE: 90 degrees

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
		Stations 1-65 blank		66	-	91	0.4
				67	Trace	92	0.4
				68	"	93	0.3
				69	"	94	0.4
				70	"	95	0.4
				71	"	96	0.4
				72	"	97	0.3
				73	0.8	98	0.2
				74	0.8	99	0.2
				75	0.9	100	0.2
				766	0.9		
				77	1.0		
				78	0.9		
				79	0.8		
				80	0.8		
				81	0.8		
				82	0.8		
				83	0.7		
				84	0.7		
				85	0.5		
				86	0.5		
				87	0.5		
				88	0.5		
				89	0.5		
				90	0.4		

$$\% \text{ Recovery} = \frac{.202 \times 57.5 \times 16.00 \times 16.38}{24} = 126.9$$

Total 16.00

MASS DEPOSIT

MATERIAL: Purple

DATE: 19 July 1962

FLIGHT #: 2 ; Inwind

SAMPLE LINE: A

TIME OF RELEASE: 0500 hours

DURATION: 18 seconds

FLOW RATE: 24 GPM

AIRSPEED: Constant at 57.5 mph (50 knots)

ALTITUDE: 100 feet

SWATH WIDTH: 880 feet

AIRCRAFT COURSE: 90 degrees

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Station 1-19 blank		20	-	45	0.04		
		21	2.1	46	0.08		
		22	0.9	47	0.04		
		23	0.8	48	0.04		
		24	1.0	49	0.02		
		25	0.9	50	0.1		
		26	1.0	51	0.1		
		27	0.8	52	0.1		
		28	0.9	53	0.05		
		29	0.7	54	0.05		
		30	0.8	55	0.05		
		31	0.7	56	0.05		
		32	0.7	57	0.05		
		33	0.7	58	0.05		
		34	0.5	59	0.05		
		35	0.5	60	0.01		
		36	0.4	61	0.01		
		37	0.3	62	Trace		
		38	0.1	63	"		
		39	0.2	64	"		
		40	0.08	65	"		
		41	0.1	66	-		
		42	0.05	Stations 67-100 Blank			
		43	0.08				
		44	0.1				

% Recovery = $\frac{.202 \times 57.5 \times 15.30 \times 16.38}{24} = 121.3$

Total 15.30

MASS DEPOSIT

MATERIAL: Purple

AIRSPEED: Constant at 57.5 mph (50 knots)

DATE: 19 July 1962

ALTITUDE: 75 feet

FLIGHT #: 3 ; Inwind

SWATH WIDTH: 520 feet

SAMPLE LINE: D

AIRCRAFT COURSE: 045 degrees

TIME OF RELEASE: 0518 hours

DURATION: 22 seconds

FLOW RATE: 24 GPM

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-19 blank		20	-				
		21	Trace				
		22	0.05				
		23	0.5				
		24	2.0				
		25	1.4				
		26	1.5				
		27	0.8				
		28	0.7				
		29	1.5				
		30	1.7				
		31	1.0				
		32	1.0				
		33	0.7				
		34	0.7				
		35	0.6				
		36	0.5				
		37	0.5				
		38	0.1				
		39	0.02				
		40	0.02				
		41	0.01				
		42	0.01				
		43	0.01				
		44	Trace				
		45	"				
		46	"				
		47	"				
		48	-				
		Stations 49-100 blank					

% Recovery = $\frac{.202 \times 57.5 \times 15.32 \times 18.91}{24} = 140.2$

Total 15.32

MASS DEPOSIT

MATERIAL: Purple

DATE: 19 July 1962

FLIGHT #: 4 ; Inwind

SAMPLE LINE: D

TIME OF RELEASE: 0521 hours

DURATION: 19 seconds

FLOW RATE: 24 GPM

AIRSPEED: Constant at 57.5 mph (50 knots)

ALTITUDE: 75 feet

SWATH WIDTH: 540 feet

AIRCRAFT COURSE: 45 degrees

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-57 blank				58	-	83	1.2
				59	Trace	84	0.5
				60	"	85	0.1
				61	"	86	Trace
				62	"	87	-
				63	"	Stations Blank	88-100
				64	"		
				65	0.04		
				66	0.05		
				67	0.08		
				68	0.1		
				69	0.1		
				70	0.2		
				71	0.2		
				72	0.2		
				73	0.5		
				74	0.6		
				75	0.8		
				76	0.9		
				77	1.5		
				78	1.2		
				79	1.1		
				80	0.7		
				81	1.2		
				82	1.5		

% Recovery = $\frac{.202 \times 57.5 \times 12.77 \times 18.91}{24}$ = 116.9

Total 12.77

MASS DEPOSIT

MATERIAL: Purple

AIRSPEED: Constant at 57.5 mph (50 knots)

DATE: 19 July 1962

ALTITUDE: 50 feet

FLIGHT: 5 ; Inwind

SWATH WIDTH: 420 feet

SAMPLE LINE: D

AIRCRAFT COURSE: 45 degrees

TIME OF RELEASE: 0537 hours

DURATION: 22 seconds

FLOW RATE: 24 GPM

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-55 blank				56	-		
				57	Trace		
				58	"		
				59	"		
				60	"		
				61	"		
				62	0.1		
				63	0.2		
				64	0.6		
				65	0.8		
				66	1.5		
				67	1.5		
				68	1.8		
				69	1.6		
				70	0.6		
				71	1.5		
				72	1.6		
				73	1.4		
				74	0.9		
				75	0.8		
				76	0.6		
				77	0.1		
				78	0.05		
				79	-		
				Stations 80 - 100 blank			

$$\% \text{ Recovery} = \frac{.202 \times 57.5 \times 15.65 \times 17.82}{24} = 135.0$$

Total 15.65

MASS DEPOSIT

MATERIAL: Purple

DATE: 19 July 1962

FLIGHT #: 6 ; Inwind

SAMPLE LINE: D

TIME OF RELEASE: 0539 hours

DURATION: 20 seconds

FLOW RATE: 24 GPM

AIRSPEED: Constant at 57.5 mph (50 knots)

ALTITUDE: 50 feet

SWATH WIDTH: 420 feet

AIRCRAFT COURSE: 45 degrees

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-7 blank							
8	"						
9	Trace						
10	"						
11	0.1						
12	0.2						
13	0.4						
14	0.5						
15	0.8						
16	1.4						
17	1.6						
18	1.1						
19	1.2						
20	1.2						
21	1.7						
22	1.5						
23	0.9						
24	0.8						
25	0.8						
26	0.4						
27	0.3						
28	0.1						
29	0.01						
30	Trace						
Stations 31-100 Blank							

% Recovery = $\frac{.202 \times 57.5 \times 15.01 \times 17.82}{24}$ = 129.5

Total 15.01

MASS DEPOSIT

MATERIAL: Purple

DATE: 19 July 1962

FLIGHT #: 7 ; Inwind

SAMPLE LINE: A

TIME OF RELEASE: 0619 hours

DURATION: 20 seconds

FLOW RATE: 24 GPM

AIRSPEED: Constant at 57.5 mph (50 knots)

ALTITUDE: 100 feet

SWATH WIDTH: 520 feet

AIRCRAFT COURSE: 90 degrees

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-53 Blank				54	-	79	0.1
				55	Trace	80	0.05
				56	"	81	0.02
				57	"	82	-
				58	"	Stations	83-100
				59	"	Blank	
				60	"		
				61	"		
				62	"		
				63	0.2		
				64	0.5		
				65	0.8		
				66	1.3		
				67	1.5		
				68	1.5		
				69	1.2		
				70	0.9		
				71	1.1		
				72	1.4		
				73	1.5		
				74	1.0		
				75	0.8		
				76	0.2		
				77	0.2		
				78	0.2		

$$\% \text{ Recovery} = \frac{.202 \times 57.5 \times 14.47 \times 20}{24} = 140.1$$

Total 14.47

MASS DEPOSIT

MATERIAL: Purple

AIRSPEED: Constant at 57.5 mph (50 knots)

DATE: 19 July 1962

ALTITUDE: 100 feet

FLIGHT #: 8 ; Inwind

SWATH WIDTH: 440 feet

SAMPLE LINE: A

AIRCRAFT COURSE: 90 degrees

TIME OF RELEASE: 0622 hours

DURATION: 20 seconds

FLOW RATE: 24 GPM

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-7 Blank							
8	-						
9	Trace						
10	0.02						
11	0.05						
12	0.05						
13	0.05						
14	0.2						
15	0.3						
16	0.3						
17	0.9						
18	1.2						
19	1.9						
20	1.1						
21	0.8						
22	1.2						
23	2.0						
24	0.9						
25	0.8						
26	0.4						
27	0.2						
28	0.2						
29	0.1						
30	0.05						
31	Trace						
32	-						
Stations 33-100 Blank							

$$\% \text{ Recovery} = \frac{.202 \times 57.5 \times 12.72 \times 20}{24} = 123.1$$

Total 12.72

MASS DEPOSIT

MATERIAL: Purple

AIRSPEED: Constant at 57.5 mph (50 knots)

DATE: 19 July 1962

ALTITUDE: 75 feet

FLIGHT #: 9 ; Inwind

SWATH WIDTH: 660 feet

SAMPLE LINE: A

AIRCRAFT COURSE: 90 degrees

TIME OF RELEASE: 0635 hours

DURATION: 20 seconds

FLOW RATE: 24 GPM

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-65 Blank				66	-	91	0.1
				67	Trace	92	0.08
				68	"	93	0.05
				69	3.5	94	0.08
				70	1.2	95	0.08
				71	0.9	96	0.02
				72	1.3	97	0.02
				73	1.2	98	Trace
				74	1.3	99	0.02
				75	1.2	100	Trace
				76	1.1		
				77	0.8		
				78	0.9		
				79	0.7		
				80	0.8		
				81	0.8		
				82	0.8		
				83	0.5		
				84	0.5		
				85	0.5		
				86	0.4		
				87	0.4		
				88	0.3		
				89	0.1		
				90	0.1		

$$\% \text{ Recovery} = \frac{.202 \times 57.5 \times 19.75 \times 17.14}{24} = 163.8$$

Total 19.75

MASS DEPOSIT

MATERIAL: Purple

AIRSPEED: Constant at 57.5 mph (50 knots)

DATE: 19 July 1962

ALTITUDE: 75 feet

FLIGHT #: 10 ; Inwind

SWATH WIDTH: 880 feet

SAMPLE LINE: A

AIRCRAFT COURSE: 90 degrees

TIME OF RELEASE: 0638 hours

DURATION: 22 seconds

FLOW RATE: 24 GPM

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-18 blank		44	0.1				
19	-	45	0.1				
20	3.4	46	0.05				
21	1.4	47	0.05				
22	0.9	48	0.05				
23	1.2	49	0.05				
24	1.1	50	0.05				
25	1.2	51	Trace				
26	0.9	52	"				
27	0.9	53	"				
28	0.8	54	"				
29	0.8	55	"				
30	0.8	56	0.05				
31	0.5	57	0.05				
32	0.6	58	0.02				
33	0.5	59	0.04				
34	0.2	60	0.02				
35	0.2	61	Trace				
36	0.2	62	0.02				
37	0.3	63	Trace				
38	0.2	64	"				
39	0.2	65	-				
40	0.1	Stations 66-100					
41	0.2	Blank					
42	0.2						
432	0.2						

% Recovery = $\frac{.202 \times 57.5 \times 17.65 \times 17.14}{24}$ = 146.4

Total 17.65

MASS DEPOSIT

MATERIAL: Purple

AIRSPEED: Constant at 57.5 mph (50 knots)

DATE: 19 July 1962

ALTITUDE: 50 feet

FLIGHT #: 11 ; Inwind

SWATH WIDTH: 320 feet

SAMPLE LINE: D

AIRCRAFT COURSE: 45 degrees

TIME OF RELEASE: 0658 hours

DURATION: 20 seconds

FLOW RATE: 24 GPM

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-10 Blank							
11	-						
12	Trace						
13	0.3						
14	0.5						
15	0.9						
16	1.4						
17	1.5						
18	1.3						
19	0.8						
20	1.0						
21	2.2						
22	1.6						
23	1.3						
24	0.9						
25	0.8						
26	0.2						
27	0.08						
28	Trace						
29	-						
Stations 30-100 Blank							

% Recovery = $\frac{.202 \times 57.5 \times 14.78 \times 19.32}{24}$ = 138.2

Total 14.78

MASS DEPOSIT

MATERIAL: Purple

DATE: 19 July 1962

FLIGHT #: 12 ; Inwind

SAMPLE LINE: D

TIME OF RELEASE: 0700 hours

DURATION: 19 seconds

FLOW RATE: 24 GPM

AIRSPEED: Constant at 57.5 mph (50 knots)

ALTITUDE: 50 feet

SWATH WIDTH: 500 feet

AIRCRAFT COURSE: 45 degrees

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-50 Blank				51	-	76	0.1
				52	-	77	0.2
				53	Trace	78	Trace
				54	0.02	79	-
				55	0.02	Stations	80-100
				56	0.05	blank	
				57	0.05		
				58	0.2		
				59	0.2		
				60	0.2		
				61	0.4		
				62	0.6		
				63	0.7		
				64	0.9		
				65	1.0		
				66	1.1		
				67	1.2		
				68	1.0		
				69	1.0		
				70	0.6		
				71	1.0		
				72	1.8		
				73	0.9		
				74	0.2		
				75	0.1		

% Recovery = $\frac{.202 \times 57.5 \times 13.54 \times 19.32}{24}$ = 126.6

Total 13.54

MASS DEPOSIT

MATERIAL: 2 Fuel Oil, 1 Purple

DATE: 20 July 1962

FLIGHT #: 1 ; Inwind

SAMPLE LINE: B

TIME OF RELEASE: 0445 hours

DURATION: 20 seconds

FLOW RATE: 24 GPM

AIRSPEED: Constant at 57.5 mph (50 knots)

ALTITUDE: 100 feet

SWATH WIDTH: 460 feet

AIRCRAFT COURSE: 315 degrees

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-15 blank		16	-				
		17	0.05				
		18	0.4				
		19	0.6				
		20	1.2				
		21	1.0				
		22	1.0				
		23	0.5				
		24	1.1				
		25	1.5				
		26	1.4				
		27	1.0				
		28	0.8				
		29	0.6				
		30	0.4				
		31	0.4				
		32	0.4				
		33	0.2				
		34	0.1				
		35	0.08				
		36	0.05				
		37	Trace				
		38	"				
		39	"				
		40	"				
		41	-				
		Stations 42-100 Blank					

% Recovery = $\frac{.202 \times 57.5 \times 12.78 \times 20}{24} = 123.7$

Total 12.78

MASS DEPOSIT

MATERIAL: 2 Fuel Oil, 1 Purple

DATE: 20 July 1962

FLIGHT #: 2 ; Inwind

SAMPLE LINE: B

TIME OF RELEASE: 0449 hours

DURATION: 23 seconds

FLOW RATE: 24 GPM

AIRSPEED: Constant at 57.5 mph (50 knots)

ALTITUDE: 100 feet

SWATH WIDTH: 480 feet

AIRCRAFT COURSE: 315 degrees

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-70 blank				71	-		
				72	0.4		
				73	1.1		
				74	1.0		
				75	1.0		
				76	0.8		
				77	0.4		
				78	1.2		
				79	1.0		
				80	1.1		
				81	0.8		
				82	0.7		
				83	0.6		
				84	0.3		
				85	0.2		
				86	0.1		
				87	0.1		
				88	0.08		
				89	0.05		
				90	0.05		
				91	0.05		
				92	0.05		
				93	0.02		
				94	0.02		
				95	Trace		
				96	"		
				97	-		
				Stations 98-100 blank			

% Recovery = $\frac{.202 \times 57.5 \times 11.12 \times 20}{24}$ = 107.6

Total 11.12

MASS DEPOSIT

MATERIAL: 2 Fuel Oil, 1 Purple

DATE: 20 July 1962

FLIGHT #: 3 ; Inwind

SAMPLE LINE: C

TIME OF RELEASE: 0505 hours

DURATION: 20 seconds

FLOW RATE: 24 GPM

AIRSPEED: Constant at 57.5 mph (50 knots)

ALTITUDE: 75 feet

SWATH WIDTH: 500 feet

AIRCRAFT COURSE: 180 degrees

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-20		21	-				
		22	Trace				
		23	1.2				
		24	1.0				
		25	1.0				
		26	0.7				
		27	0.8				
		28	0.9				
		29	1.0				
		30	1.0				
		31	1.0				
		32	1.0				
		33	0.9				
		34	0.8				
		35	0.7				
		36	0.4				
		37	0.4				
		38	0.3				
		39	0.1				
		40	0.08				
		41	0.05				
		42	Trace				
		43	"				
		44	"				
		45	"				
		46	"				
		47	"				
		48	-				
		Stations 49-100 blank					

$$\% \text{ Recovery} = \frac{.202 \times 57.5 \times 13.33 \times 16.96}{24} = 109.4$$

Total 13.33

MASS DEPOSIT

MATERIAL: 2 Fuel Oil, 1 Purple — AIRSPEED: Constant at 57.5 mph (50 knots)

DATE: 20 July 1962 — ALTITUDE: 75 feet

FLIGHT #: 4 ; Inwind — SWATH WIDTH: 540 feet

SAMPLE LINE: C — AIRCRAFT COURSE: 180 degrees

TIME OF RELEASE: 0509 hours

DURATION: 23 seconds

FLOW RATE: 24 GPM

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-58 blank				59	-	84	0.3
				60	-	85	0.1
				61	Trace	86	0.1
				62	"	87	0.1
				63	"	88	0.05
				64	"	89	-
				65	"	Stations	90-100
				66	"	blank	
				67	"		
				68	"		
				69	"		
				70	"		
				71	"		
				72	"		
				73	"		
				74	1.5		
				75	1.0		
				76	0.9		
				77	0.7		
				78	0.8		
				79	0.9		
				80	1.0		
				81	1.0		
				82	0.9		
				83	0.7		

$$\% \text{ Recovery} = \frac{.202 \times 57.5 \times 10.05 \times 16.96}{24} = 82.5$$

Total 10.05

MASS DEPOSIT

MATERIAL: 2 Fuel Oil, 1 Purple

DATE: 20 July 1962

FLIGHT #: 5 ; Inwind

SAMPLE LINE: B

TIME OF RELEASE: 0525 hours

DURATION: 23 seconds

FLOW RATE: 24 GPM

AIRSPEED: Constant at 57.5 mph (50 knots)

ALTITUDE: 50 feet

SWATH WIDTH: 540 feet

AIRCRAFT COURSE: 135 degrees

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-68 blank				69	-	94	Trace
				70	0.6	95	"
				71	1.4	96	"
				72	1.1	97	"
				73	1.0	98	-
				74	0.7	Stations 99-100	
				75	0.7	blank	
				76	0.8		
				77	0.9		
				78	1.1		
				79	0.9		
				80	0.8		
				81	0.8		
				82	0.5		
				83	0.5		
				84	0.3		
				85	0.1		
				86	0.1		
				87	0.08		
				88	0.05		
				89	0.05		
				90	0.05		
				91	0.02		
				92	0.01		
				93	Trace		

% Recovery = $\frac{.202 \times 57.5 \times 12.56 \times 16.77}{24}$ = 101.9

Total 12.56

MASS DEPOSIT

MATERIAL: 2 Fuel Oil, 1 Purple

DATE: 20 July 1962

FLIGHT #: 6 ; Inwind

SAMPLE LINE: B

TIME OF RELEASE: 0527 hours

DURATION: 24 seconds

FLOW RATE: 24 GPM

AIRSPEED: Constant at 57.5 mph (50 knots)

ALTITUDE: 50 feet

SWATH WIDTH: 580 feet

AIRCRAFT COURSE: 135 degrees

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Station 1-18 blank		19	-	44	0.01		
		20	-	45	0.01		
		21	0.5	46	0.01		
		22	1.2	47	0.01		
		23	1.1	48	0.01		
		24	1.0	49	Trace		
		25	0.5	50	"		
		26	0.9	51	-		
		27	1.0	Stations 52-100 blank			
		28	1.2				
		29	1.1				
		30	1.0				
		31	0.9				
		32	0.8				
		33	0.8				
		34	0.4				
		35	0.4				
		36	0.3				
		37	0.3				
		38	0.1				
		39	0.1				
		40	0.1				
		41	0.08				
		42	0.08				
		43	0.02				

$$\% \text{ Recovery} = \frac{.202 \times 57.5 \times 13.93 \times 16.77}{24} = 113.1$$

Total 13.93

MASS DEPOSIT

MATERIAL: 2 Fuel Oil, 1 Purple

DATE: 20 July 1962

FLIGHT #: 7 ; Crosswind

SAMPLE LINE: B

TIME OF RELEASE: 0605 hours

DURATION: 21 seconds

FLOW RATE: 24 GPM

AIRSPEED: Constant at 57.5 mph (50 knots)

ALTITUDE: 100 feet

SWATH WIDTH: 520 feet

AIRCRAFT COURSE: 135 degrees

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Station 1-72 blank				73	-	98	0.04
				74	Trace	99	0.05
				75	1.1	100	0.02
				76	0.9		
				77	0.9		
				78	0.9		
				79	0.9		
				80	0.9		
				81	0.9		
				82	1.1		
				83	1.0		
				84	0.9		
				85	0.9		
				86	0.8		
				87	0.4		
				88	0.3		
				89	0.2		
				90	0.2		
				91	0.1		
				92	0.1		
				93	0.08		
				94	0.05		
				95	0.05		
				96	0.1		
				97	0.08		

Total 12.97

MASS DEPOSIT

MATERIAL: 2 Fuel Oil, 1 Purple

AIRSPEED: Constant at 57.5 mph (50 knots)

DATE: 20 July 1962

ALTITUDE: 100 feet

FLIGHT #: 8 ; Crosswind

SWATH WIDTH: 1100 feet

SAMPLE LINE: B

AIRCRAFT COURSE: 135 degrees

TIME OF RELEASE: 0609 hours

DURATION: 21 seconds

FLOW RATE: 24 GPM

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-15 blank		16	-	41	0.7	66	0.02
		17	Trace	42	0.6	67	0.02
		18	"	43	0.5	68	0.02
		19	"	44	0.5	69	0.01
		20	"	45	0.4	70	0.01
		21	"	46	0.3	71	Trace
		22	"	47	0.2	72	"
		23	"	48	0.2	73	-
		24	"	49	0.1	Stations blank	74-100
		25	"	50	0.1		
		26	0.9	51	0.1		
		27	0.9	52	0.08		
		28	0.9	53	0.08		
		29	0.9	54	0.08		
		30	0.9	55	0.08		
		31	1.1	56	0.1		
		32	0.9	57	0.1		
		33	0.8	58	0.08		
		34	0.8	59	0.08		
		35	0.8	60	0.05		
		36	0.8	61	0.05		
		37	0.7	62	0.05		
		38	0.6	63	0.02		
		39	0.6	64	0.02		
		40	0.6	65	0.02		

Total 16.87

MASS DEPOSIT

MATERIAL: 2 Fuel Oil, 1 Purple

AIRSPEED: Constant at 57.5 mph (50 knots)

DATE: 20 July 1962

ALTITUDE: 75 feet

FLIGHT #: 9 ; Inwind

SWATH WIDTH: 560 feet

SAMPLE LINE: D

AIRCRAFT COURSE: 45 degrees

TIME OF RELEASE: 0623 hours

DURATION: 22 seconds

FLOW RATE: 24 GPM

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-47 blank				48	-	73	0.7
				49	Trace	74	0.8
				50	"	75	1.0
				51	"	76	1.2
				52	"	77	0.9
				53	"	78	-
				54	"	Stations 79-100	
				55	"	Blank	
				56	0.05		
				57	0.05		
				58	0.06		
				59	0.06		
				60	0.08		
				61	0.1		
				62	0.1		
				63	0.2		
				64	0.3		
				65	0.4		
				66	0.5		
				67	0.7		
				68	0.8		
				69	0.9		
				70	0.9		
				71	0.9		
				72	0.8		

% Recovery = $\frac{.202 \times 57.5 \times 11.44 \times 20}{24}$ = 110.7

Total 11.44

MASS DEPOSIT

MATERIAL: 2 Fuel Oil, 1 Purple

DATE: 20 July 1962

FLIGHT #: 10 ; Inwind

SAMPLE LINE: D

TIME OF RELEASE: 06[illegible] hours

DURATION: 22 seconds

FLOW RATE: 24 GPM

AIRSPEED: Constant at 57.5 mph (50 knots

ALTITUDE: 75 feet

SWATH WIDTH: 520 feet

AIRCRAFT COURSE: 45 degrees

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
1	0.1	26	1.1				
2	0.1	27	1.3				
3	0.2	28	-				
4	0.2	Stations 29-100 blank					
5	0.2						
6	0.2						
7	0.3						
8	0.4						
9	0.4						
10	0.4						
11	0.5						
12	0.4						
13	0.6						
14	0.6						
15	0.7						
16	0.7						
17	0.8						
18	0.9						
19	1.0						
20	1.1						
21	0.9						
22	0.9						
23	0.9						
24	0.9						
25	0.9						

% Recovery = $\frac{.202 \times 57.5 \times 16.7 \times 20}{24}$ = 161.7

Total 16.7

MASS DEPOSIT

MATERIAL: 2 Fuel Oil, 1 Purple

DATE: 20 July 1962

FLIGHT #: 11 ; Inwind

SAMPLE LINE: D

TIME OF RELEASE: 0637 hours

DURATION: 22 seconds

FLOW RATE: 24 GPM

AIRSPEED: Constant at 57.5 mph (50 knots)

ALTITUDE: 50 feet

SWATH WIDTH: 980 feet

AIRCRAFT COURSE: 45 degrees

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Station 1-25 blank		26	-	51	0.1	76	1.2
		27	-	52	0.1	77	2.2
		28	Trace	53	0.2	78	-
		29	"	54	0.3	Stations	79-100
		30	"	55	0.3	blank	
		31	"	56	0.3		
		32	"	57	0.4		
		33	"	58	0.4		
		34	"	59	0.4		
		35	"	60	0.5		
		36	"	61	0.5		
		37	"	62	0.5		
		38	"	63	0.6		
		39	"	64	0.7		
		40	"	65	0.8		
		41	0.01	66	0.8		
		42	0.02	67	0.9		
		43	0.05	68	1.2		
		44	0.08	69	1.2		
		45	0.08	70	1.4		
		46	0.08	71	1.3		
		47	0.1	72	0.9		
		48	0.1	73	1.0		
		49	0.1	74	0.9		
		50	0.05	75	0.8		

% Recovery = $\frac{.202 \times 57.5 \times 20.57 \times 18.41}{24}$ = 183.3

Total 20.57

MASS DEPOSIT

MATERIAL: 2 Fuel Oil, 1 Purple

AIRSPEED: Constant at 57.5 mph (50 knots)

DATE: 20 July 1962

ALTITUDE: 50 feet

FLIGHT #: 12 ; Inwind

SWATH WIDTH: 520 feet

SAMPLE LINE: D

AIRCRAFT COURSE: 45 degrees

TIME OF RELEASE: 0640 hours

DURATION: 22 seconds

FLOW RATE: 24 GPM

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
1	0.01	26	0.9				
2	0.01	27	1.3				
3	0.05	28	"				
4	0.02	Stations 29-100 blank					
5	0.02						
6	0.01						
7	0.02						
8	0.04						
9	0.05						
10	0.08						
11	0.2						
12	0.2						
13	0.3						
14	0.3						
15	0.4						
16	0.5						
17	0.6						
18	0.7						
19	0.8						
20	0.9						
21	0.9						
22	0.7						
23	0.7						
24	0.6						
25	0.7						

% Recovery = $\frac{.202 \times 57.5 \times 1101 \times 18.41}{24}$ = 98.1

Total 11.01

MASS DEPOSIT

MATERIAL: Fuel Oil

AIRSPEED: Constant at 57.5 mph (50 knots)

DATE: 20 July 1962 (p.m.)

ALTITUDE: 100 feet

FLIGHT #: 1 ; Inwind

SWATH WIDTH: 240 feet

SAMPLE LINE: C

AIRCRAFT COURSE: 180 degrees

TIME OF RELEASE: 1115 hours

DURATION: 18 seconds

FLOW RATE: 24 GPM

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-61 blank				62	-		
				63	0.2		
				64	0.4		
				65	0.3		
				66	0.4		
				67	0.7		
				68	0.8		
				69	0.7		
				70	0.5		
				71	0.5		
				72	0.7		
				73	0.5		
				74	Trace		
				75	"		
				76	-		
				Stations 77-100 blank			

% Recovery = $\frac{.202 \times 57.5 \times 5.7 \times 18.79}{24} = 51.8$

Total 5.7

MASS DEPOSIT

MATERIAL: Fuel Oil

DATE: 20 July 1962 (p.m.)

FLIGHT #: 2 ; Inwind

SAMPLE LINE: C

TIME OF RELEASE: 1118 hours

DURATION: 28 seconds

FLOW RATE: 24 GPM

AIRSPEED: Constant at 57.5 mph (50 knots)

ALTITUDE: 100 feet

SWATH WIDTH: 540 feet

AIRCRAFT COURSE: 180 degrees

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
1	0.1	26	0.5				
2	0.1	27	0.3				
3	0.1	28	Trace				
4	0.1	29	-				
5	0.1	Stations 30-100 blank					
6	0.1						
7	0.2						
8	0.2						
9	0.2						
10	0.2						
11	0.2						
12	0.2						
13	0.2						
14	0.2						
15	0.5						
16	0.5						
17	0.7						
18	0.7						
19	0.8						
20	0.8						
21	0.7						
22	0.8						
23	0.7						
24	0.5						
25	0.5						

$$\% \text{ Recovery} = \frac{.202 \times 57.5 \times 10.2 \times 18.79}{24} = 92.8$$

Total 10.2

MASS DEPOSIT

MATERIAL: Fuel Oil

DATE: 20 July 1962 (p.m.)

FLIGHT #: 3 ; Inwind

SAMPLE LINE: C

TIME OF RELEASE: 1132 hours

DURATION: 25 seconds

FLOW RATE: 24 GPM

AIRSPEED: Constant at 57.5 mph (50 knots)

ALTITUDE: 75 feet

SWATH WIDTH: 460 feet

AIRCRAFT COURSE: 180 degrees

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-60 blank				61	-		
				62	Trace		
				63	0.02		
				64	0.08		
				65	0.1		
				66	0.1		
				67	0.1		
				68	0.2		
				69	0.4		
				70	0.7		
				71	0.5		
				72	0.5		
				73	0.3		
				74	0.3		
				75	0.4		
				76	0.5		
				77	0.7		
				78	0.7		
				79	0.6		
				80	0.6		
				81	0.4		
				82	0.2		
				83	0.1		
				84	Trace		
				85	"		
				86	-		
				Stations 87- 100 blank			

% Recovery = $\frac{.202 \times 57.5 \times 7.5 \times 20}{24}$ = 72.6

Total 7.5

MASS DEPOSIT

MATERIAL: Fuel Oil

AIRSPEED: Constant at 57.5 mph (50 knots)

DATE: 20 July 1962 (p.m.)

ALTITUDE: 75 feet

FLIGHT #: 4 ; Inwind

SWATH WIDTH: 660 feet

SAMPLE LINE: C

AIRCRAFT COURSE: 180 degrees

TIME OF RELEASE: 1135 hours

DURATION: 27 seconds

FLOW RATE: 24 GPM

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
1	Blank	26	0.4				
2	"	27	0.4				
3	"	28	0.2				
4	"	29	0.3				
5	"	30	0.1				
6	"	31	0.2				
7	-	32	0.2				
8	Trace	33	0.1				
9	"	34	0.1				
10	"	35	0.05				
11	0.04	36	0.05				
12	0.06	37	0.02				
13	0.1	38	0.05				
14	0.1	39	0.05				
15	0.2	40	0.04				
16	0.4	41	0.01				
17	0.4	42	-				
18	0.5	Stations 43-100 blank					
19	0.7						
20	0.5						
21	0.6						
22	0.4						
23	0.2						
24	0.4						
25	0.2						

% Recovery = $\frac{.202 \times 57.5 \times 7.07 \times 20}{24}$ = 68.4

Total 7.07

MASS DEPOSIT

MATERIAL: Fuel Oil

AIRSPEED: Constant at 57.5 mph (50 knots)

DATE: 20 July 1962 (p.m.)

ALTITUDE: 50 feet

FLIGHT #: 5 ; Inwind

SWATH WIDTH: 420 feet

SAMPLE LINE: C

AIRCRAFT COURSE: 180 degrees

TIME OF RELEASE: 1149 hours

DURATION: 20 seconds

FLOW RATE: 24 GPM

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
1	0.08						
2	0.08						
3	0.08						
4	0.08						
5	0.1						
6	0.1						
7	0.1						
8	0.2						
9	0.2						
10	0.3						
11	0.3						
12	0.4						
13	0.5						
14	0.7						
15	0.9						
16	0.9						
17	0.8						
18	0.8						
19	0.9						
20	0.9						
21	0.9						
22	0.5						
23	-						

Stations 24 -100 blank

$$\% \text{ Recovery} = \frac{.202 \times 57.5 \times 9.82 \times 17.32}{24} = 82.3$$

Total 9.82

MASS DEPOSIT

MATERIAL: Fuel Oil

AIRSPEED: Constant at 57.5 mph (50 knots)

DATE: 20 July 1962 (p.m.)

ALTITUDE: 50 feet

FLIGHT #: 6 ; Inwind

SWATH WIDTH: 720 feet

SAMPLE LINE: C

AIRCRAFT COURSE: 180 degrees

TIME OF RELEASE: 1152 hours

DURATION: 20 seconds

FLOW RATE: 24 GPM

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-36 blank		37	-	62	0.4		
		38	Trace	63	0.5		
		39	"	64	0.6		
		40	"	65	0.7		
		41	0.02	66	0.8		
		42	0.02	67	0.7		
		43	0.02	68	0.6		
		44	Trace	69	0.5		
		45	"	70	0.6		
		46	"	71	0.7		
		47	0.02	72	0.8		
		48	0.02	73	0.7		
		49	Trace	74	0.5		
		50	0.02	75	-		
		51	0.01	Station 76-100 blank			
		52	0.01				
		53	0.01				
		54	0.01				
		55	0.03				
		56	0.05				
		57	0.09				
		58	0.1				
		59	0.2				
		60	0.3				
		61	0.4				

Recovery = $\frac{.202 \times 57.5 \times 9.42 \times 17.32}{24} = 79.0$

Total 9.42

MASS DEPOSIT

MATERIAL: Fuel Oil

DATE: 21 July 1962

FLIGHT #: 1 ; Inwind

SAMPLE LINE: B

TIME OF RELEASE: 0443 hours

DURATION: 18 seconds

FLOW RATE: 24 GPM

AIRSPEED: Constant at 57.5 mph (50 knots)

ALTITUDE: 100 feet

SWATH WIDTH: 620 feet

AIRCRAFT COURSE: 315 degrees

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
1	Blank	26	0.8				
2	"	27	0.8				
3	"	28	0.7				
4	"	29	0.6				
5	"	30	0.4				
6	"	31	0.4				
7	"	32	0.2				
8	"	33	0.2				
9	"	34	0.2				
10	"	35	0.2				
11	"	36	0.1				
12	"	37	0.1				
13	-	38	0.08				
14	Trace	39	0.08				
15	"	40	0.05				
16	"	41	0.05				
17	0.5	42	0.02				
18	0.9	43	Trace				
19	0.6	44	"				
20	0.7	45	"				
21	0.5	46	-				
22	0.6	Stations 47-100 blank					
23	0.8						
24	0.8						
25	0.8						

% Recovery = $\frac{.202 \times 57.5 \times 11.18 \times 17.82}{24}$ = 96.4

Total 11.18

MASS DEPOSIT

MATERIAL: Fuel Oil

AIRSPEED: Constant at 57.5 mph (50 knots)

DATE: 21 July 1962

ALTITUDE: 100 feet

FLIGHT #: 2 ; Inwind

SWATH WIDTH: 620 feet

SAMPLE LINE: B

AIRCRAFT COURSE: 315 degrees

TIME OF RELEASE: 0445 hours

DURATION: 20 seconds

FLOW RATE: 24 GPM

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-65 blank				66	-	91	0.03
				67	Trace	92	0.02
				68	"	93	Trace
				69	0.9	94	"
				70	0.9	95	"
				71	0.8	96	"
				72	0.8	97	"
				73	0.7	98	"
				74	0.7	99	-
				75	0.7	100	-
				76	0.7		
				77	0.8		
				78	0.8		
				79	0.6		
				80	0.6		
				81	0.4		
				82	0.3		
				83	0.2		
				84	0.2		
				85	0.2		
				86	0.2		
				87	0.2		
				88	0.1		
				89	0.1		
				90	0.05		

% Recovery = $\frac{.202 \times 57.5 \times 11.0 \times 17.82}{24}$ = 94.9

Total 11.0

MASS DEPOSIT

MATERIAL: Fuel Oil

DATE: 21 July 1962

FLIGHT #: 3 ; Inwind

SAMPLE LINE: C

TIME OF RELEASE: 0503 hours

DURATION: 25 seconds

FLOW RATE: 24 GPM

AIRSPEED: Constant at 57.5 mph (50 knots)

ALTITUDE: 75 feet

SWATH WIDTH: 680 feet

AIRCRAFT COURSE: 360 degrees

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-48 blank				49	-	74	0.7
				50	Trace	75	0.8
				51	"	76	0.9
				52	"	77	0.8
				53	"	78	0.8
				54	0.01	79	0.9
				55	0.04	80	0.9
				56	0.05	81	0.9
				57	0.05	82	0.9
				58	0.06	83	0.05
				59	0.06	84	Trace
				60	0.08	85	-
				61	0.08	Stations 86-100	
				62	0.08	blank	
				63	0.1		
				64	0.1		
				65	0.2		
				66	0.2		
				67	0.3		
				68	0.4		
				69	0.4		
				70	0.5		
				71	0.5		
				72	0.6		
				73	0.6		

% Recovery = $\frac{.202 \times 57.5 \times 12.06 \times 17.82}{24}$ = 104.0

Total 12.06

MASS DEPOSIT

MATERIAL: Fuel Oil

AIRSPEED: Constant at 57.5 mph (50 knots)

DATE: 21 July 1962

ALTITUDE: 75 feet

FLIGHT #: 4 ; Inwind

SWATH WIDTH: 560 feet

SAMPLE LINE: C

AIRCRAFT COURSE: 360 degrees

TIME OF RELEASE: 0505 hours

DURATION: 20 seconds

FLOW RATE: 24 GPM

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
1	Blank	26	0.8				
2	"	27	0.8				
3	"	28	0.8				
4	"	29	0.8				
5	-	30	0.8				
6	Trace	31	0.8				
7	"	32	0.9				
8	"	33	1.0				
9	"	34	Trace				
10	0.02	35	-				
11	0.05	Stations 36-100 blank					
12	0.06						
13	0.08						
14	0.08						
15	0.08						
16	0.1						
17	0.1						
18	0.2						
19	0.2						
20	0.2						
21	0.3						
22	0.4						
23	0.5						
24	0.6						
25	0.8						

% Recovery = $\frac{.202 \times 57.5 \times 10.47 \times 17.82}{24} = 90.3$

Total 10.47

MASS DEPOSIT

MATERIAL: Fuel Oil

AIRSPEED: Constant at 57.5 mph (50 knots)

DATE: 21 July 1962

ALTITUDE: 50 feet

FLIGHT #: 5 ; Inwind

SWATH WIDTH: 560 feet

SAMPLE LINE: C

AIRCRAFT COURSE: 360 degrees

TIME OF RELEASE: 0519 hours

DURATION: 22 seconds

FLOW RATE: 24 GPM

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Station 1-50 blank				51	Trace	76	0.7
				52	"	77	1.0
				53	0.05	78	1.0
				54	0.05	79	Trace
				55	0.08	80	-
				56	0.08	Stations blank	81-100
				57	0.08		
				58	0.08		
				59	0.1		
				60	0.1		
				61	0.2		
				62	0.2		
				63	0.2		
				64	0.2		
				65	0.3		
				66	0.3		
				67	0.4		
				68	0.4		
				69	0.6		
				70	0.8		
				71	0.7		
				72	0.9		
				73	0.8		
				74	0.7		
				75	0.8		

% Recovery = $\frac{.202 \times 57.5 \times 10.82 \times 17.32}{24} = 90.7$

Total 10.82

MASS DEPOSIT

MATERIAL: Fuel Oil

AIRSPEED: Constant at 57.5 mph (50 knots)

DATE: 21 July 1962

ALTITUDE: 50 feet

FLIGHT #: 6 ; Inwind

SWATH WIDTH: 540 feet

SAMPLE LINE: C

AIRCRAFT COURSE: 360 degrees

TIME OF RELEASE: 0521 hours

DURATION: 22 seconds

FLOW RATE: 24 GPM

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
1	Trace	26	0.9				
2	"	27	1.0				
3	"	28	0.5				
4	"	29	-				
5	"	Stations 30-100 blank					
6	0.05						
7	0.05						
8	0.05						
9	0.05						
10	0.05						
11	0.08						
12	0.08						
13	0.1						
14	0.1						
15	0.1						
16	0.2						
17	0.2						
18	0.4						
19	0.6						
20	0.8						
21	0.8						
22	0.8						
23	0.9						
24	0.8						
25	0.7						

% Recovery = $\frac{.202 \times 57.5 \times 9.31 \times 17.32}{24}$ = 78.0

Total 9.31

MASS DEPOSIT

MATERIAL: Fuel Oil

AIRSPEED: Constant at 57.5 mph (50 knots)

DATE: 21 July 1962

ALTITUDE: 100 feet

FLIGHT #: 7 ; Inwind

SWATH WIDTH: 560 feet

SAMPLE LINE: B

AIRCRAFT COURSE: 315 degrees

TIME OF RELEASE: 0601 hours

DURATION: 25 seconds

FLOW RATE: 24 GPM

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
1	Blank	26	0.5				
2	"	27	0.4				
3	"	28	0.05				
4	"	29	Trace				
5	"	30	"				
6	"	31	"				
7	"	32	"				
8	-	33	"				
9	Trace	34	"				
10	"	35	"				
11	"	36	"				
12	0.05	37	"				
13	0.08	38	-				
14	0.1	Stations 39-100 blank					
15	0.3						
16	0.5						
17	0.9						
18	0.9						
19	0.6						
20	0.6						
21	0.6						
22	0.5						
23	0.6						
24	0.8						
25	0.6						

% Recovery = $\frac{.202 \times 57.5 \times 8.08 \times 20}{24}$ = 78.2

Total 8.08

MASS DEPOSIT

MATERIAL: Fuel Oil

DATE: 21 July 1962

FLIGHT #: 8 ; Inwind

SAMPLE LINE: B

TIME OF RELEASE: 0604 hours

DURATION: 20 seconds

FLOW RATE: 24 GPM

AIRSPEED: Constant at 57.5 mph (50 knots)

ALTITUDE: 100 feet

SWATH WIDTH: 520 feet

AIRCRAFT COURSE: 315 degrees

STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.	STATION	G.P.A.
Stations 1-47 blank				48	-		
				49	Trace		
				50	"		
				51	"		
				52	"		
				53	0.02		
				54	0.05		
				55	0.05		
				56	0.08		
				57	0.05		
				58	0.05		
				59	0.1		
				60	0.1		
				61	0.2		
				62	0.3		
				63	0.4		
				64	0.5		
				65	0.8		
				66	0.7		
				67	0.7		
				68	0.6		
				69	0.6		
				70	0.5		
				71	0.7		
				72	0.9		
				73	0.7		
				74	0.1		
				75	0.05		
				76	-		
				Stations 77-100 blank			

$$\% \text{ Recovery} = \frac{.202 \times 57.5 \times 8.25 \times 20}{24} = 79.9$$

Total 8.25

MASS MEDIAN DIAMETER

DATE: 19 July 1962 SPREAD FACTOR: 6.0

FLIGHT #: 2 ; Inwind CONVERSION FACTOR: 2.2

SAMPLE LINE: A PAPER: Kromekote (Red)

FLOW RATE: 24 GPM SPRAY MATERIAL: Purple

$$\text{MMD} = \frac{\text{Spot D-max}}{\text{Spread Factor} \times \text{Conv. Factor}}$$

$$\text{Spherical Drop Size} = \frac{\text{Spot Dia.}}{\text{Spread Factor}}$$

Sta.	Drop #	Size	Sta.	Drop #	Size
21	1	5200			
21	2	4600*			
21	3	4500			
21	4	4300			
21	5	4200			
21	6	4100			
21	7	3900			
21	8	3800			
21	9	3700			
21	10	3600			
21	11	3500			
21	12	3400			
21	13	3200			
21	14	3100			
21	15	3000			

a

$$\text{MMD} = \frac{4600}{13.2} = 348 \text{ microns}$$

$$\text{Max. Sph. Dia.} = \frac{5200}{6} = 866 \text{ microns}$$

$$\text{Min. Sph. Dia.} = \frac{300}{6} = 50 \text{ microns}$$

MASS MEDIAN DIAMETER

DATE: 26 July 1962 SPREAD FACTOR: 6.0

FLIGHT #: 2 ; Inwind CONVERSION FACTOR: 2.2

SAMPLE LINE: B PAPER: Kromekote (Red)

FLOW RATE: 24 GPM SPRAY MATERIAL: 2 Fuel Oil, 1 Purple

$$MMD = \frac{\text{Spot D-max}}{\text{Spread Factor x Conv. Factor}}$$

$$\text{Spherical Drop Size} = \frac{\text{Spot Dia.}}{\text{Spread Factor}}$$

Sta.	Drop #	Size	Sta.	Drop #	Size
78	1	4300			
78	2	4100			
78	3	4000			
78	4	3900			
78	5	3600*			
78	6	3500			
78	7	3300			
78	8	3200			
78	9	3100			
78	10	3000			
78	11	2900			
78	12	2800			
78	13	2700			
78	14	2600			
72	15	2500			

$$MMD = \frac{3600}{13.2} = 273 \text{ microns}$$

$$\text{Max. Sph. Dia.} = \frac{4300}{6} = 716 \text{ microns}$$

$$\text{Min. Sph. Dia.} = \frac{300}{6} = 50 \text{ microns}$$

MASS MEDIAN DIAMETER

DATE: 20 July 1962 SPREAD FACTOR: 6.0

FLIGHT #: 8 ; Inwind CONVERSION FACTOR: 2.2

SAMPLE LINE: B PAPER: Kromekote (Red)

FLOW RATE: 24 GPM SPRAY MATERIAL: 2 Fuel Oil, 1 Purple

$$\text{MMD} = \frac{\text{Spot D-max}}{\text{Spread Factor x Conv. Factor}}$$

$$\text{Spherical Drop Size} = \frac{\text{Spot Dia.}}{\text{Spread Factor}}$$

Sta.	Drop #	Size	Sta.	Drop #	Size
26	1	4300			
26	2	3500*			
34	3	3300			
34	4	3200			
26	5	3100			
26	6	3000			
26	7	2900			
27	8	2700			
27	9	2600			
27	10	2500			
27	11	2400			

$$\text{MMD} = \frac{3500}{13.2} = 265 \text{ microns}$$

$$\text{Max. Sph. Dia.} = \frac{4300}{6} = 716 \text{ microns}$$

$$\text{Min. Sph. Dia.} = \frac{300}{6} = 50 \text{ microns}$$

MASS MEDIAN DIAMETER

DATE: 21 July 1962 SPREAD FACTOR: 6.0

FLIGHT #: 7 ; Inwind CONVERSION FACTOR: 2.2

SAMPLE LINE: B PAPER: Kromekote (Red)

FLOW RATE: 24 GPM SPRAY MATERIAL: Fuel Oil

$$\text{MMD} = \frac{\text{Spot D-Max}}{\text{Spread Factor x Conv. Factor}}$$

$$\text{Spherical Drop Size} = \frac{\text{Spot Dia.}}{\text{Spread Factor}}$$

Sta.	Drop #	Size	Sta.	Drop #	Size
17	1	4300			
17	2	3500			
17	3	3100*			
17	4	3000			
17	5	2800			
17	6	2700			
17	7	2600			
17	8	2500			
17	9	2400			
16	10	2300			
16	11	2200			
16	12	2100			

$$\text{MMD} = \frac{3100}{13.2} = 235 \text{ microns}$$

$$\text{Max. Sph. Dia.} = \frac{4300}{6} = 716 \text{ microns}$$

$$\text{Min. Sph. Dia.} = \frac{300}{6} = 50 \text{ microns}$$

MASS MEDIAN DIAMETER

DATE: 21 July 1962 SPREAD FACTOR: 6.0

FLIGHT #: 8 ; Inwind CONVERSION FACTOR: 2.2

SAMPLE LINE: B PAPER: Kromekote (Red)

FLOW RATE: 24 GPM SPRAY MATERIAL: Fuel Oil

$$MMD = \frac{\text{Spot D-max}}{\text{Spread Factor x Conv. Factor}}$$

$$\text{Spherical Drop Size} = \frac{\text{Spot Dia.}}{\text{Spread Factor}}$$

Sta.	Drop #	Size	Sta.	Drop #	Size
72	1	3500*			
72	2	3300			
72	3	3200			
72	4	3100			
72	5	2900			
72	6	2700			
72	7	2500			
72	8	2400			
72	9	2300			
72	10	2200			

$$MMD = \frac{3500}{13.2} = 265 \text{ microns}$$

$$\text{Max. Sph. Dia.} = \frac{3500}{6} = 583 \text{ microns}$$

$$\text{Min. Sph. Dia.} = \frac{300}{6} = 50 \text{ microns}$$

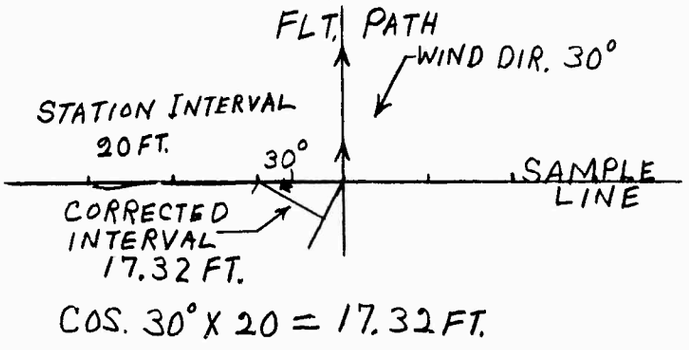
APPENDIX C

CORRECTIONS FOR SWATH WIDTH AND PERCENT RECOVERY

CORRECTIONS FOR SWATH WIDTH AND PERCENT RECOVERY*

Swath width corrections, for determining the interval (distance in feet) between sampling stations, total swath widths, effective swath widths and percent of recovery of the spray released from the aircraft, are necessary when either the angle (greater than 15°) of wind direction or spray release are not perpendicular with the sampling line.

In the illustration below with a 30° angle of wind from the perpendicular to the sampling line, it can be calculated that the corrected distance



between the stations is 17.32 ft instead of 20 ft. If the effective swath at 1.5 gpa was 200 ft the corrected swath width would be 173.2 ft.

The corrected distance between stations is important for the calculation of the percent recovery of the spray material.

The formula used for percent recovery was:

$$\% \text{ Recovery} = \frac{.202 \times \text{Airspeed} \times \text{Total Deposit} \times \text{Station Interval}}{\text{Flow Rate in GPM}}$$

In several instances the percent recovery was in excess of 100%. This can be due to estimating the deposit too high or inaccurate wind direction data, aircraft heading off of inwind and/or air turbulence obtaining over the grid some 2000 ft from the "met" station.

Accuracy in measuring wind direction and velocity at various altitudes is very important during spray fall.

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* Prepared by Mr. W. B. Johnson

APPENDIX D

SCHEDULE AND SUPPORT

(SAMPLE)
HIDAL SPRAY TEST
Project #0071W

Flight Scheduled 19 July 1962
and daily thereafter

TEST OBJECTIVES: Deposition, swath width and particle size determinations of spray solutions to be made from in-flight releases at various altitudes.

TEST SITES: Field #2 for ground flow rate determinations; Range 52 South for flight tests.

EQUIPMENT: HIDAL mounted on helicopter, HUS-1, number 145786.

SPRAY MATERIALS: It is proposed to test three solutions to determine the flow rates of these solutions in the following order:

1. Purple
2. 1 Purple - 2 Fuel Oil
3. Fuel Oil

AIRSPEED: 50 knots (all flights - constant).

ALTITUDES: 100, 75, 50 feet.
(Subject to revision depending on weather and wind velocities. The highest altitude will be flown first and will be inwind flights. Crosswind flights will be made at 75 and 100 feet if winds of 8 mph or less are obtained. The higher the wind velocity, the lower will be the altitude. Decisions will be made by the controller and instructions communicated by him to the pilot.)

APGC SUPPORT REQUIRED:

METRO: 1 observer to be in place at Range 52-S at 0350 hours capable of providing temperature, dew point, wind speed, wind direction during test period at ground level; temperature, wind direction and velocity at 50, 75, 100, and 125 ft altitude. Of this information the wind direction at the altitude is most important in order to select the most appropriate sample line. For the first run this information is required at least 10 minutes in advance (0420). Subsequently all met measurements will commence at the time of spraying on each run and be completed and available to the controller as soon as possible. The time period of obtaining the met information will also be recorded, example 0335 to 0440 hours.

COMMUNICATIONS:	2 mobile air/ground communications units to be in place at 0350, Range 52-S, or 4 Walkie Talkie radios if available.
TRANSPORTATION REQUIRED:	5 Jeeps w/drivers, source Army personnel, will pick up personnel at quarters, provide transportation to mess hall, test site and return.
AIRCRAFT #:	145786
LOAD INFORMATION:	2 drums of Purple, loaded at Field #2, after static test completed on 18 July 1962.
FERRY INFORMATION:	Aircraft will return and land at Field #2 for servicing and static testing.
DOSEMENT:	Mass median diameter particle size estimate of mass deposit. The results to be plotted on graph paper for analysis.
MISSION NUMBER:	3

COORDINATION SCHEDULE

FLIGHT CREW		FIELD CREW	
Wake Up	0230	Wake Up	0230
Transp Mess Hall	0245	Transp Mess Hall	0245
Breakfast	0250	Breakfast	0250
Transp to Range	0315	Transp to Range	0315
Take Off	0420	Set Up Range	0350
Live Run	0430	1st Run	0430
Land at Field #2	0700	Depart Range	0630
		Arrive Test Ops	0715

LABORATORY CREW

WORK SCHEDULE: 0700 to 1700 hours or as demanded. SCHEDULE OF EVENTS: Daily

Mass Deposit Flight.

1. Assay cards for deposit rate.
2. Tabulate data.
3. Graphical representation of data.
4. Ascertain swath width.
5. Calculate % of recovery of spray.

Mass Median Diameter Flights.

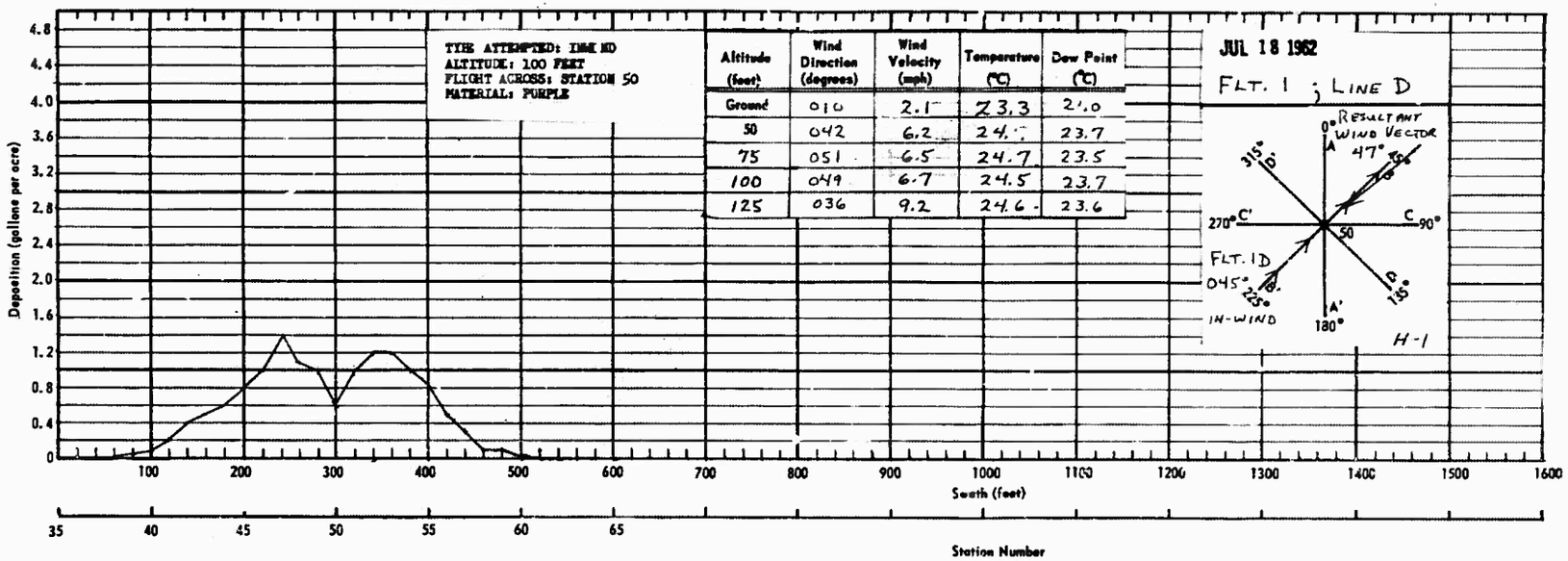
1. Determine 5 largest droplets having no more than 200 mm difference.
2. Select largets of the group and apply formula mmd = $\frac{\text{D-max}}{6.0 \times 2.2}$
3. Determine droplet size spectrum - largest to smallest droplet measurable. Divide by Sf 6.0 to convert to spherical drop size.

Jeep and Truck Drivers

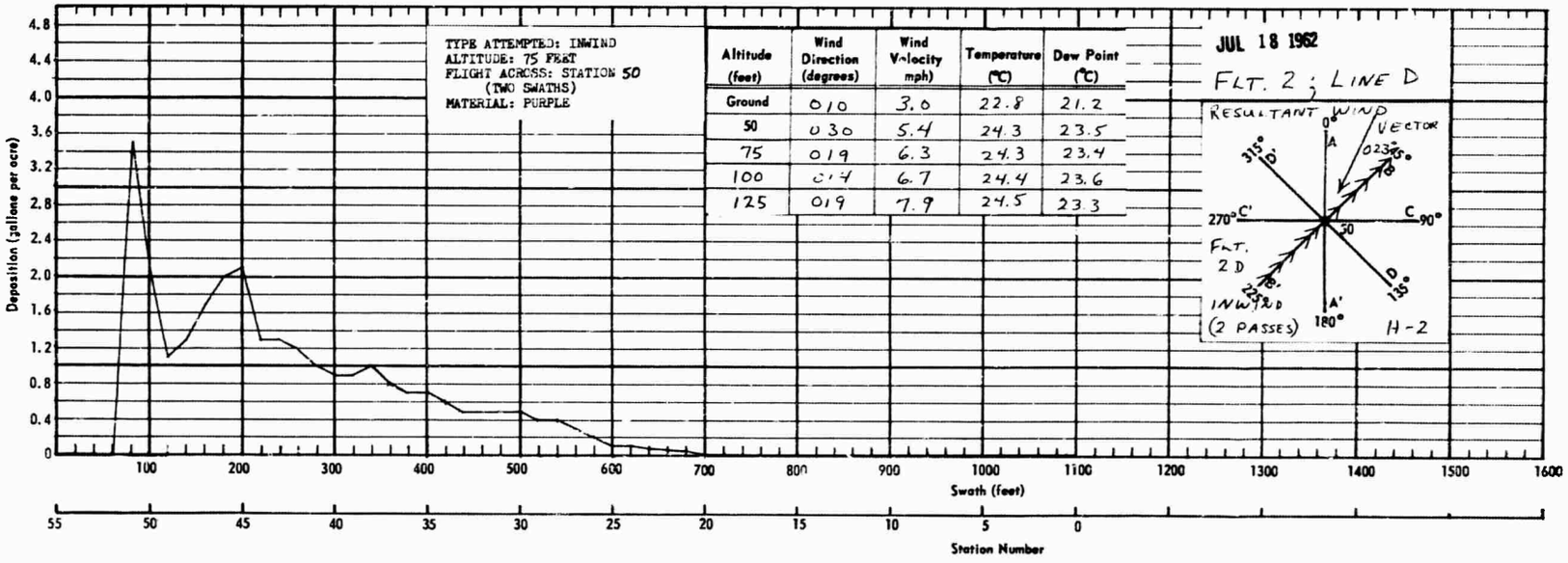
1. All vehicles to have fuel and oil checks made on the day before an early morning departure.
2. The 1½ ton truck will be first to report to building 496 in the morning and from there it will depart to Test Ops to load, then to mess hall.
3. The jeeps will report to building 496 for pick up of personnel and then depart directly to mess hall.
4. Upon arriving at test area jeeps and crews working sample line will form to the rear of the 1½ ton truck for pick up of plates.
5. On completion of days tests the 1½ ton truck will depart to Test Ops, to unload equipment.
6. Jeeps will depart test area and proceed to Test Ops.
7. All vehicles needing washing will depart from Test Ops, and proceed to motor pool, after vehicles are washed, personnel will return to Test Ops.

APPENDIX E

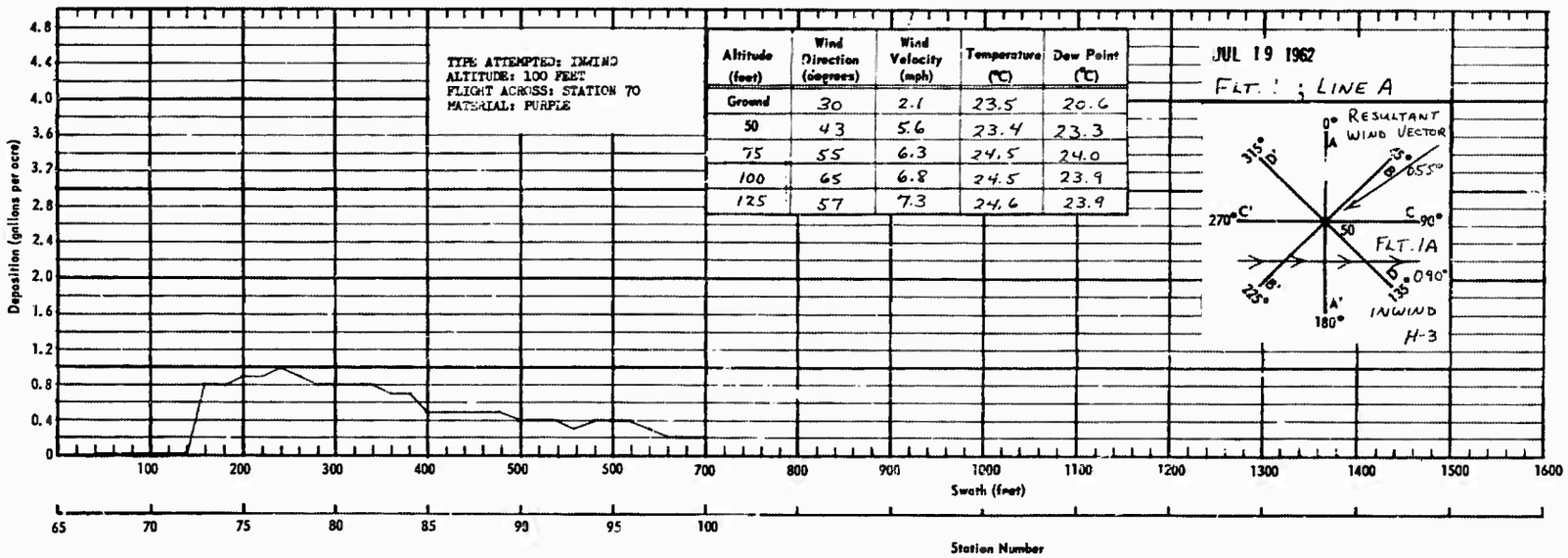
GRAPHIC PRESENTATIONS



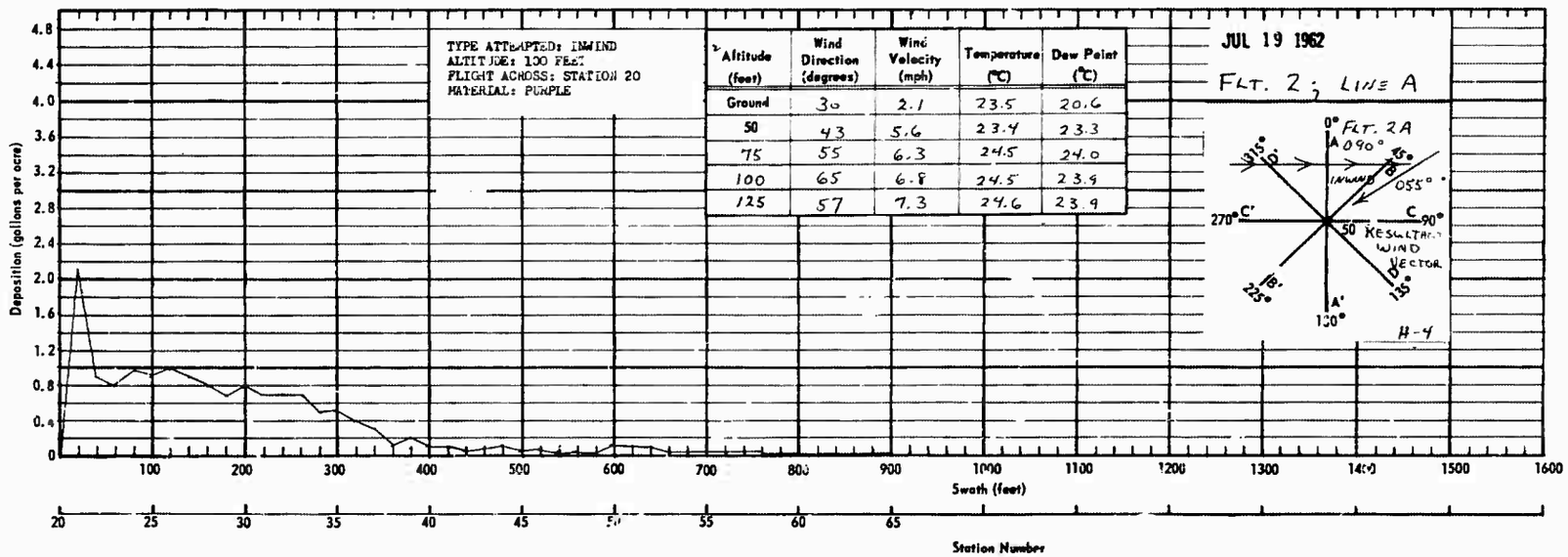
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	010	2.1	23.3	21.0
50	042	6.2	24.1	23.7
75	051	6.5	24.7	23.5
100	049	6.7	24.5	23.7
125	036	9.2	24.6	23.6



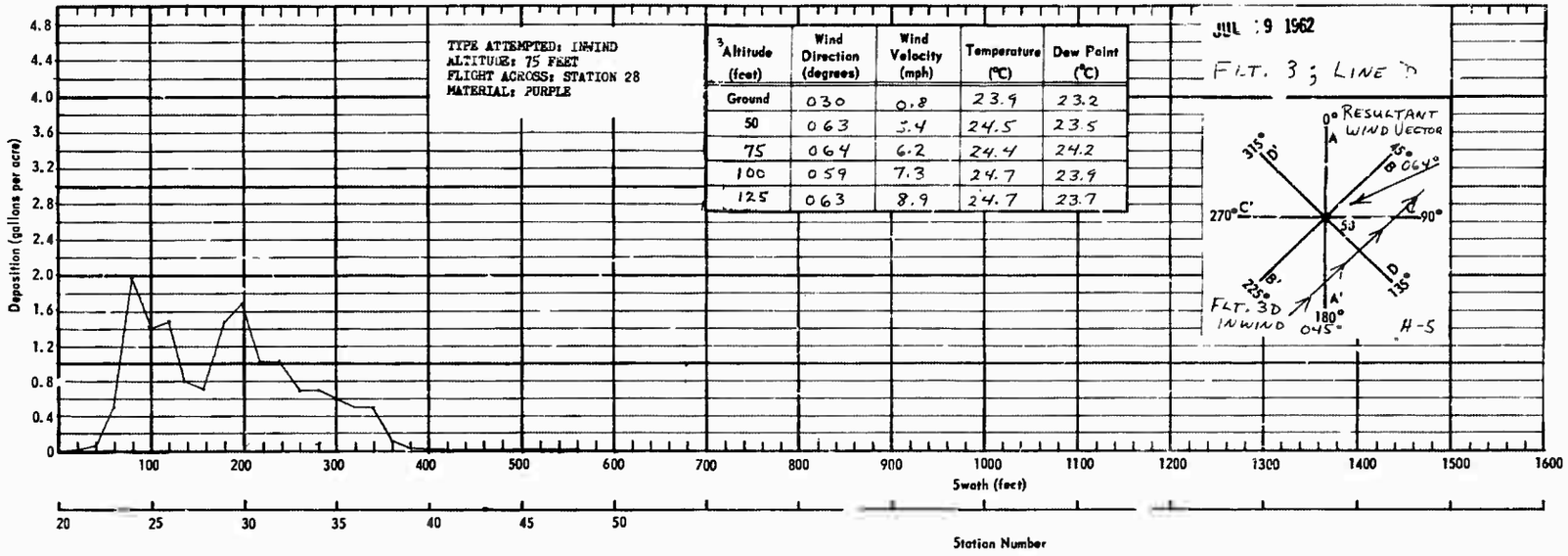
Altitude (feet)	Wind Direction (degrees)	Wind Velocity mph)	Temperature (°C)	Dew Point (°C)
Ground	010	3.0	22.8	21.2
50	030	5.4	24.3	23.5
75	019	6.3	24.3	23.4
100	014	6.7	24.4	23.6
125	019	7.9	24.5	23.3



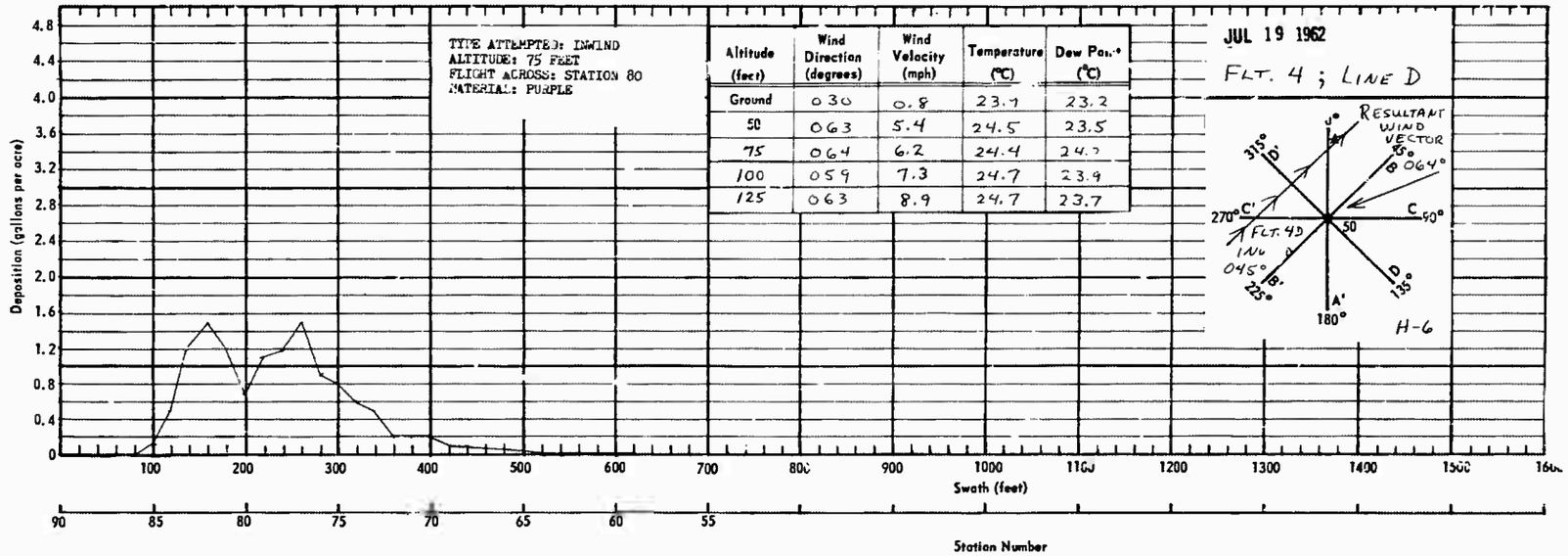
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	30	2.1	23.5	20.6
50	43	5.6	23.4	23.3
75	55	6.3	24.5	24.0
100	65	6.8	24.5	23.9
125	57	7.3	24.6	23.9



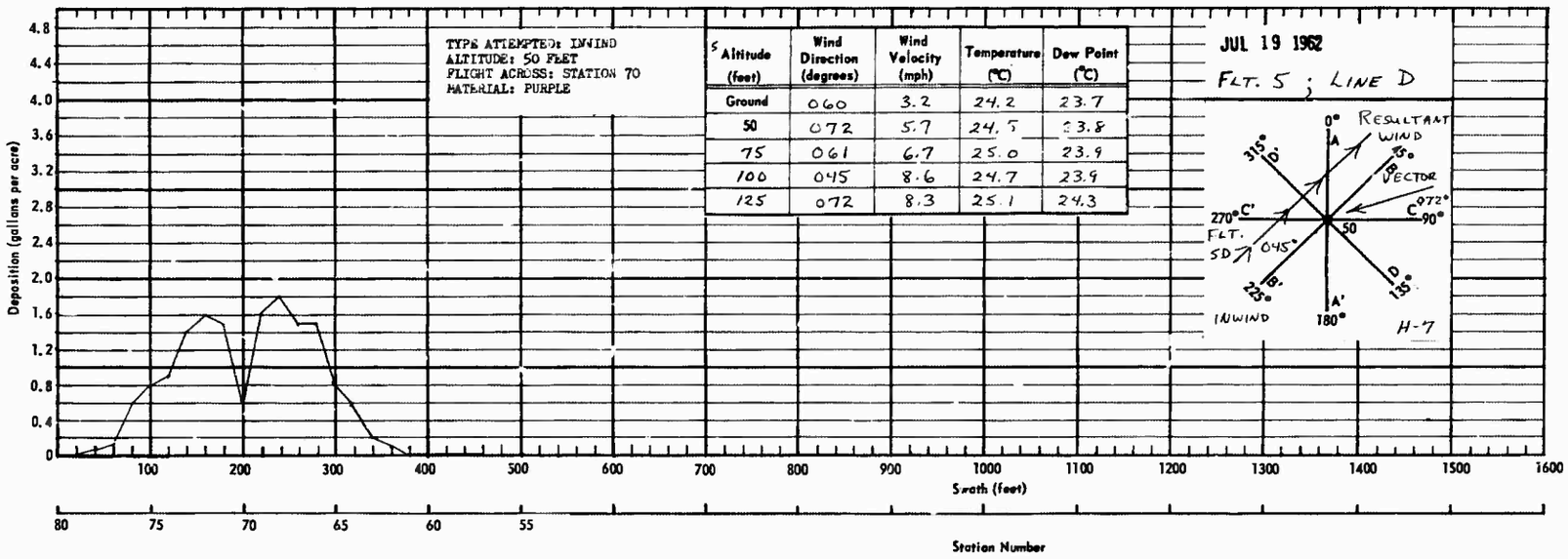
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	30	2.1	23.5	20.6
50	43	5.6	23.4	23.3
75	55	6.3	24.5	24.0
100	65	6.8	24.5	23.9
125	57	7.3	24.6	23.9



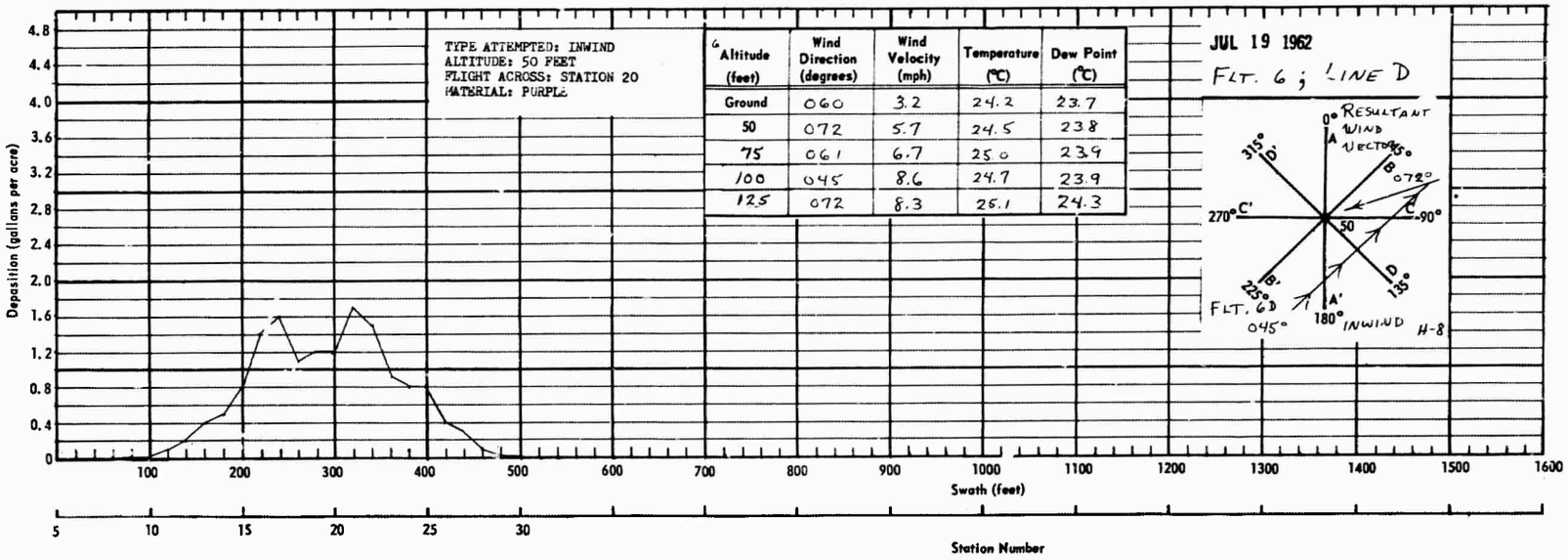
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	030	0.8	23.9	23.2
50	063	5.4	24.5	23.5
75	064	6.2	24.4	24.2
100	059	7.3	24.7	23.9
125	063	8.9	24.7	23.7



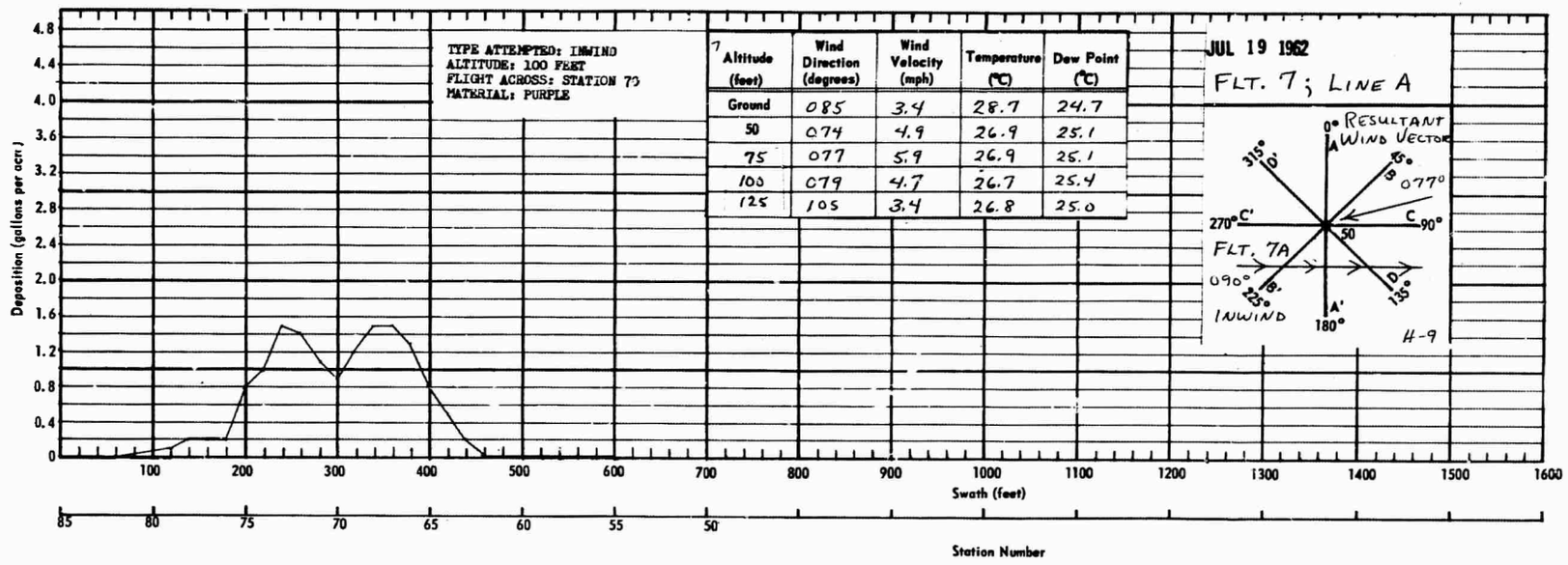
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	030	0.8	23.9	23.2
50	063	5.4	24.5	23.5
75	064	6.2	24.4	24.2
100	059	7.3	24.7	23.9
125	063	8.9	24.7	23.7



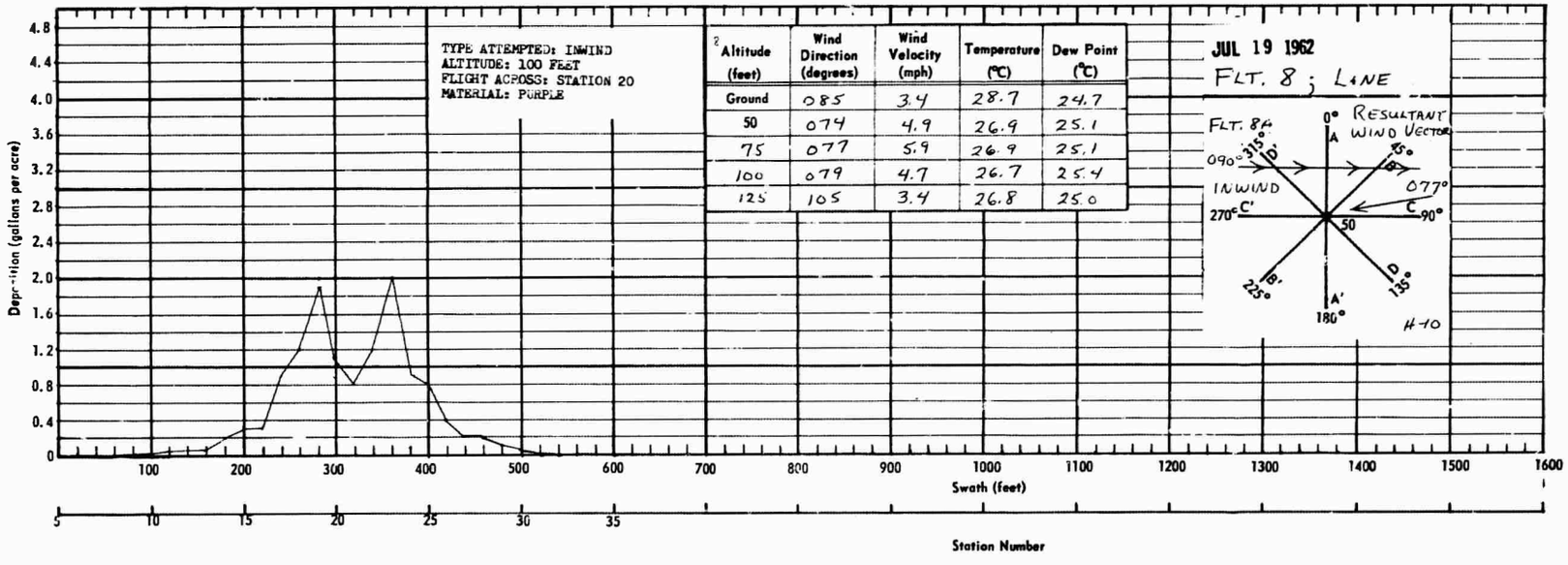
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	060	3.2	24.2	23.7
50	072	5.7	24.5	23.8
75	061	6.7	25.0	23.9
100	045	8.6	24.7	23.9
125	072	8.3	25.1	24.3



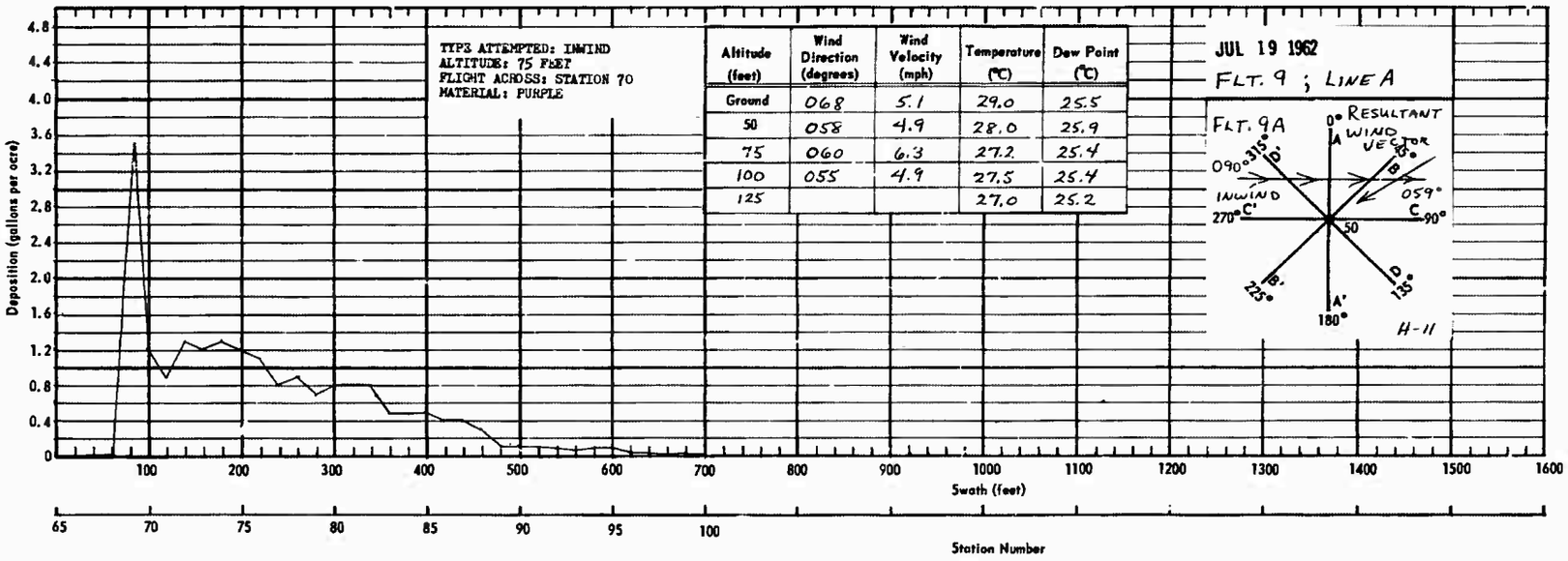
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	060	3.2	24.2	23.7
50	072	5.7	24.5	23.8
75	061	6.7	25.0	23.9
100	045	8.6	24.7	23.9
125	072	8.3	25.1	24.3



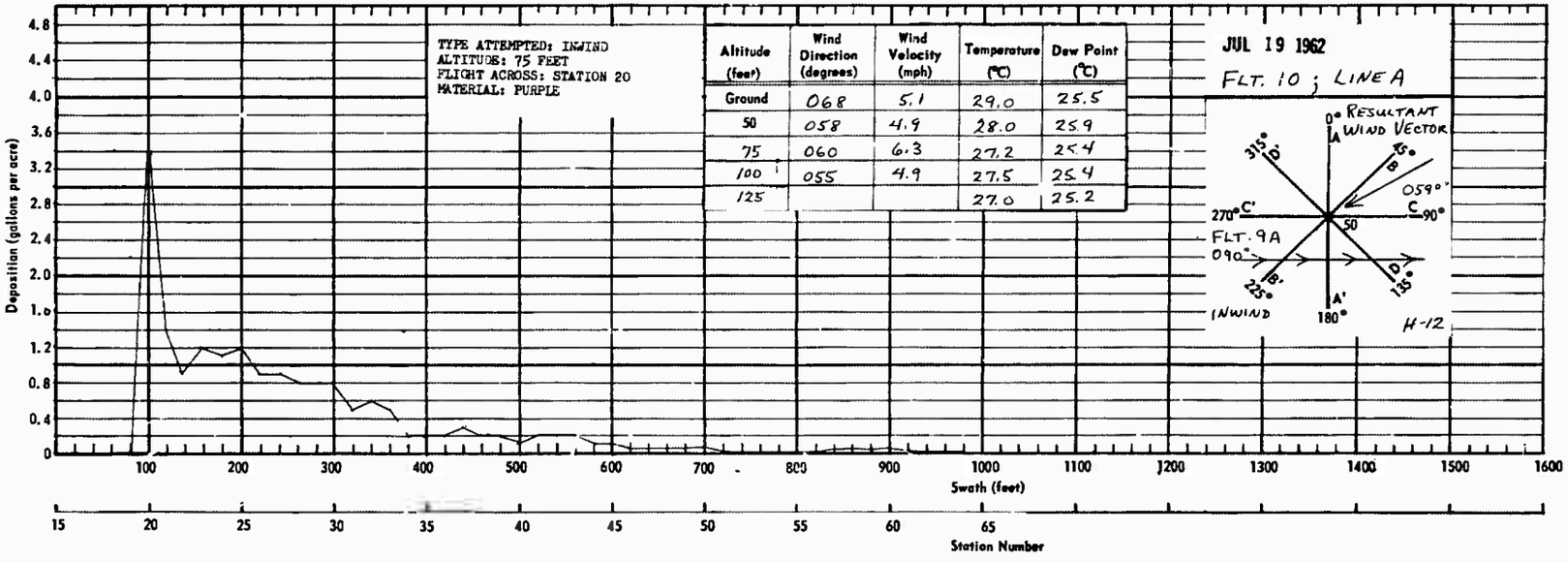
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	085	3.4	28.7	24.7
50	074	4.9	26.9	25.1
75	077	5.9	26.9	25.1
100	079	4.7	26.7	25.4
125	105	3.4	26.8	25.0



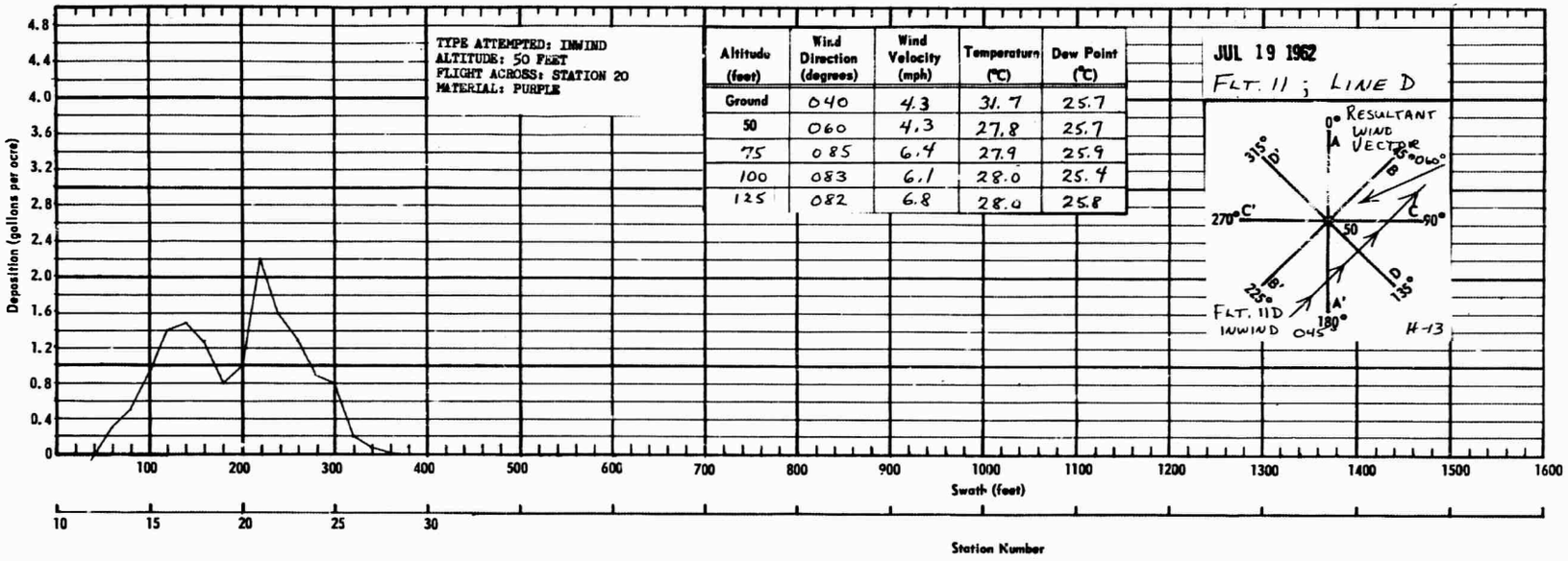
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	085	3.4	28.7	24.7
50	074	4.9	26.9	25.1
75	077	5.9	26.9	25.1
100	079	4.7	26.7	25.4
125	105	3.4	26.8	25.0



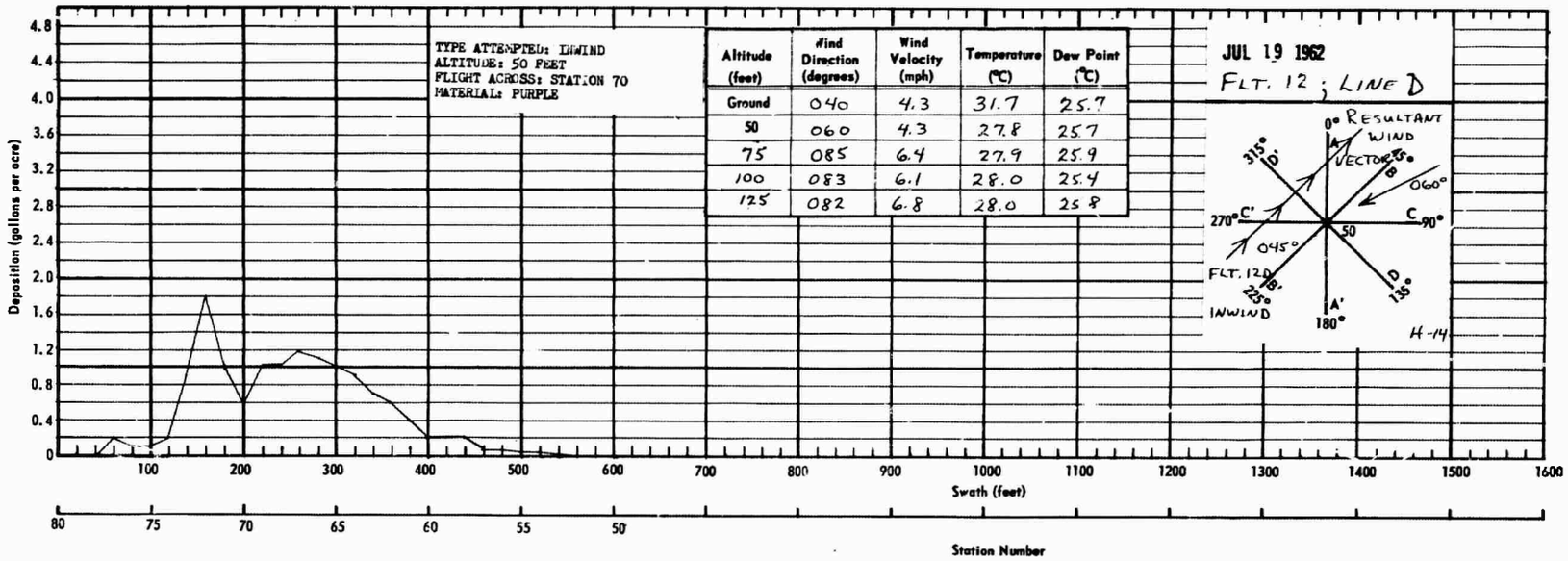
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	068	5.1	29.0	25.5
50	058	4.9	28.0	25.9
75	060	6.3	27.2	25.4
100	055	4.9	27.5	25.4
125			27.0	25.2



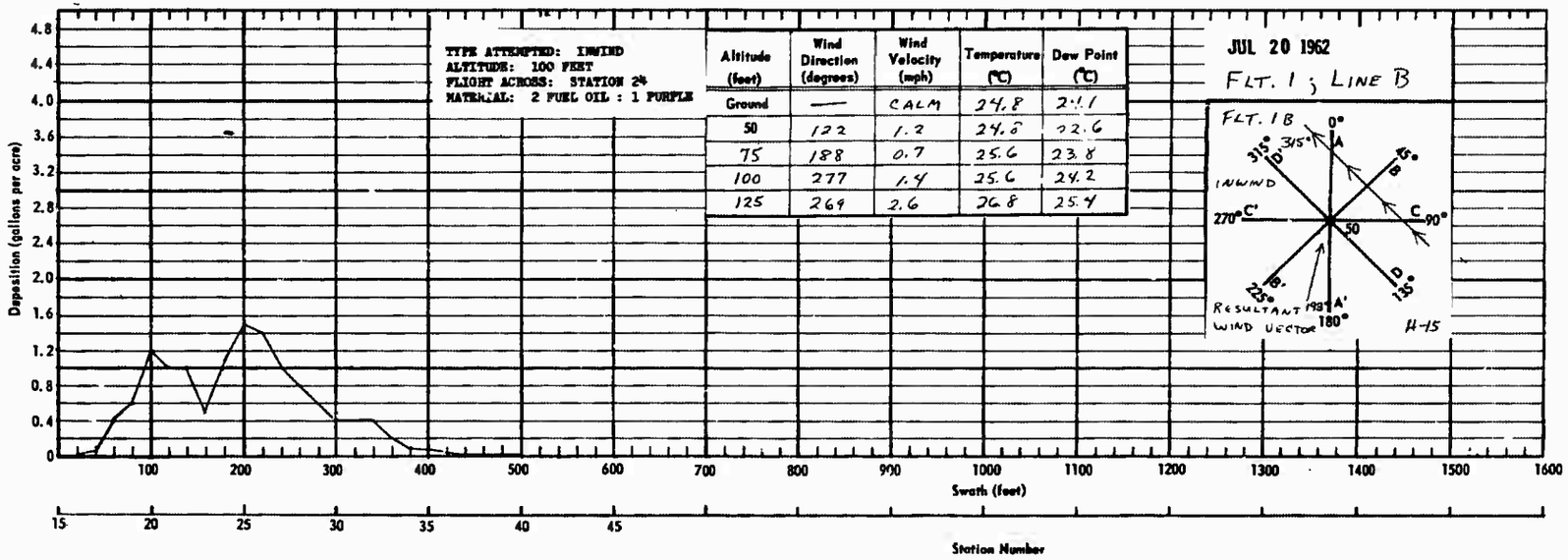
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	068	5.1	29.0	25.5
50	058	4.9	28.0	25.9
75	060	6.3	27.2	25.4
100	055	4.9	27.5	25.4
125			27.0	25.2



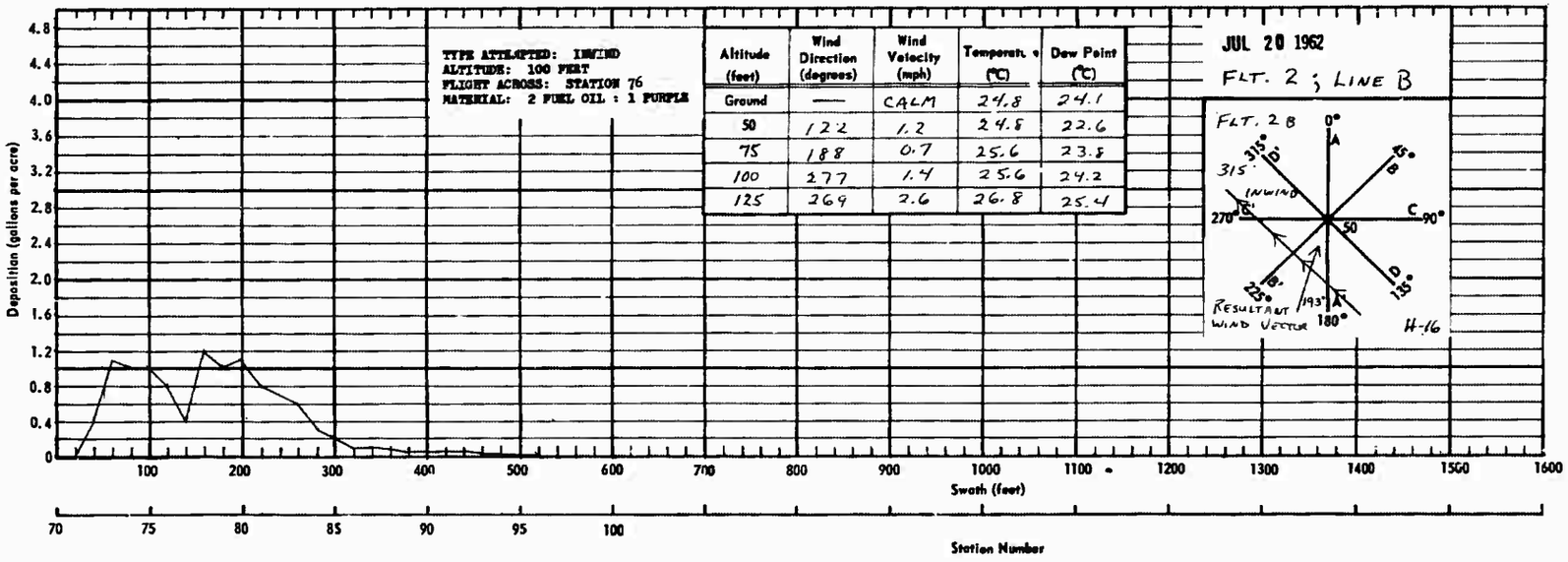
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	040	4.3	31.7	25.7
50	060	4.3	27.8	25.7
75	085	6.4	27.9	25.9
100	083	6.1	28.0	25.4
125	082	6.8	28.0	25.8



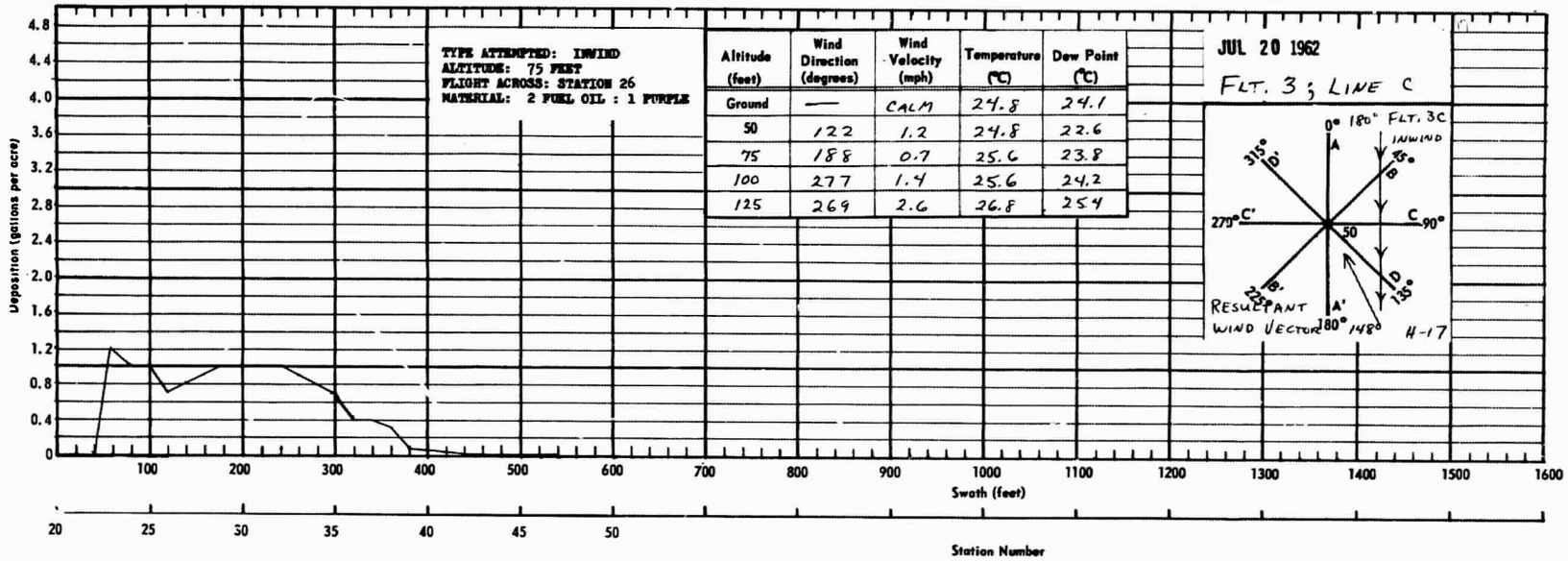
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	040	4.3	31.7	25.7
50	060	4.3	27.8	25.7
75	085	6.4	27.9	25.9
100	083	6.1	28.0	25.4
125	082	6.8	28.0	25.8



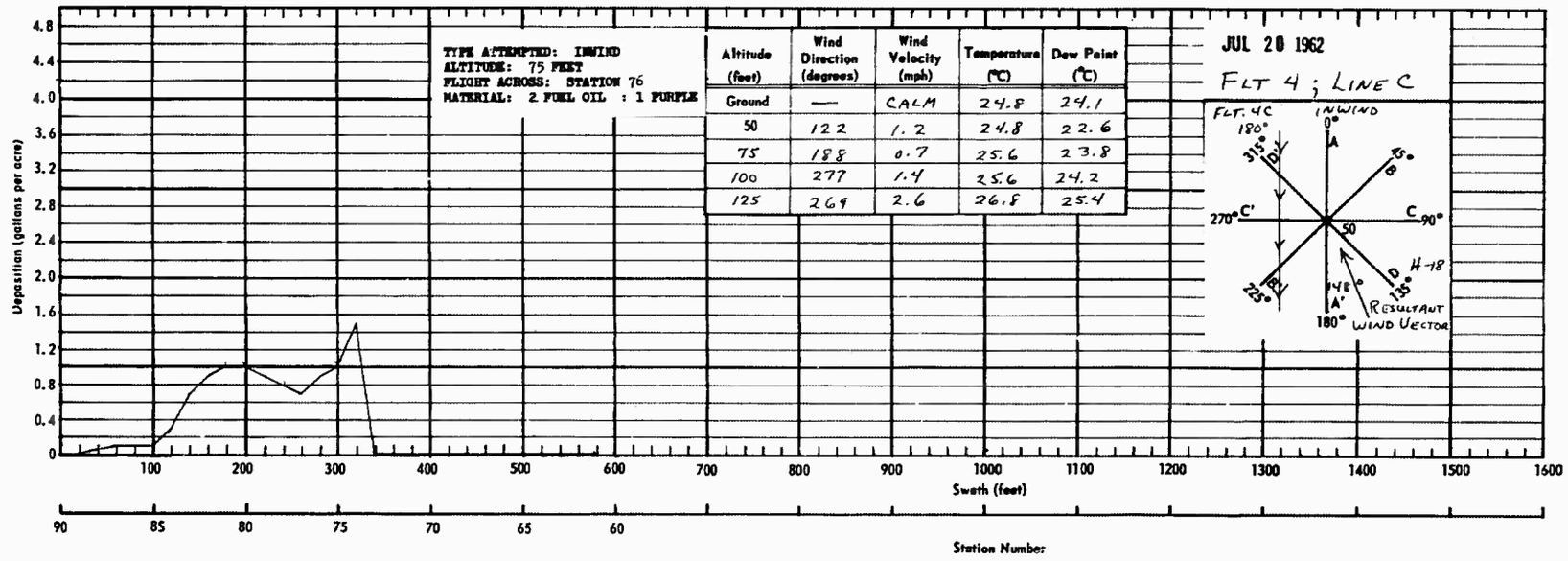
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	——	CALM	24.8	24.1
50	122	1.2	24.8	22.6
75	188	0.7	25.6	23.8
100	277	1.4	25.6	24.2
125	269	2.6	26.8	25.4



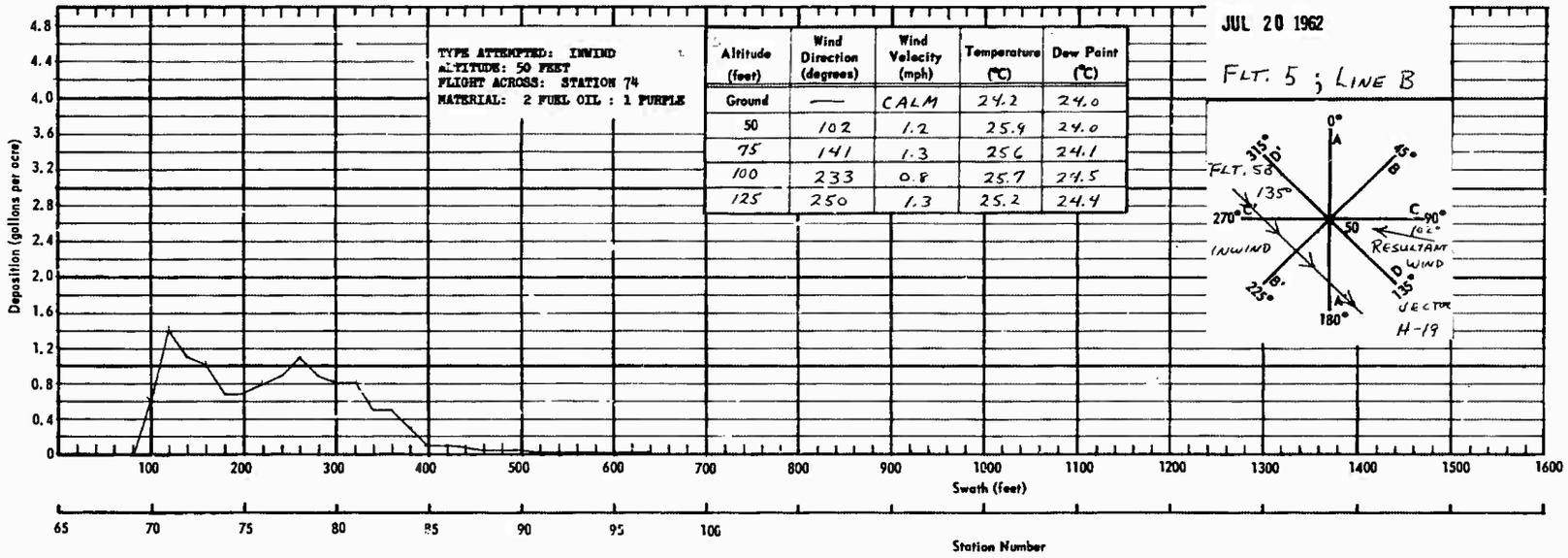
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	——	CALM	24.8	24.1
50	122	1.2	24.8	22.6
75	188	0.7	25.6	23.8
100	277	1.4	25.6	24.2
125	269	2.6	26.8	25.4



Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	—	CALM	24.8	24.1
50	122	1.2	24.8	22.6
75	188	0.7	25.6	23.8
100	277	1.4	25.6	24.2
125	269	2.6	26.8	25.4



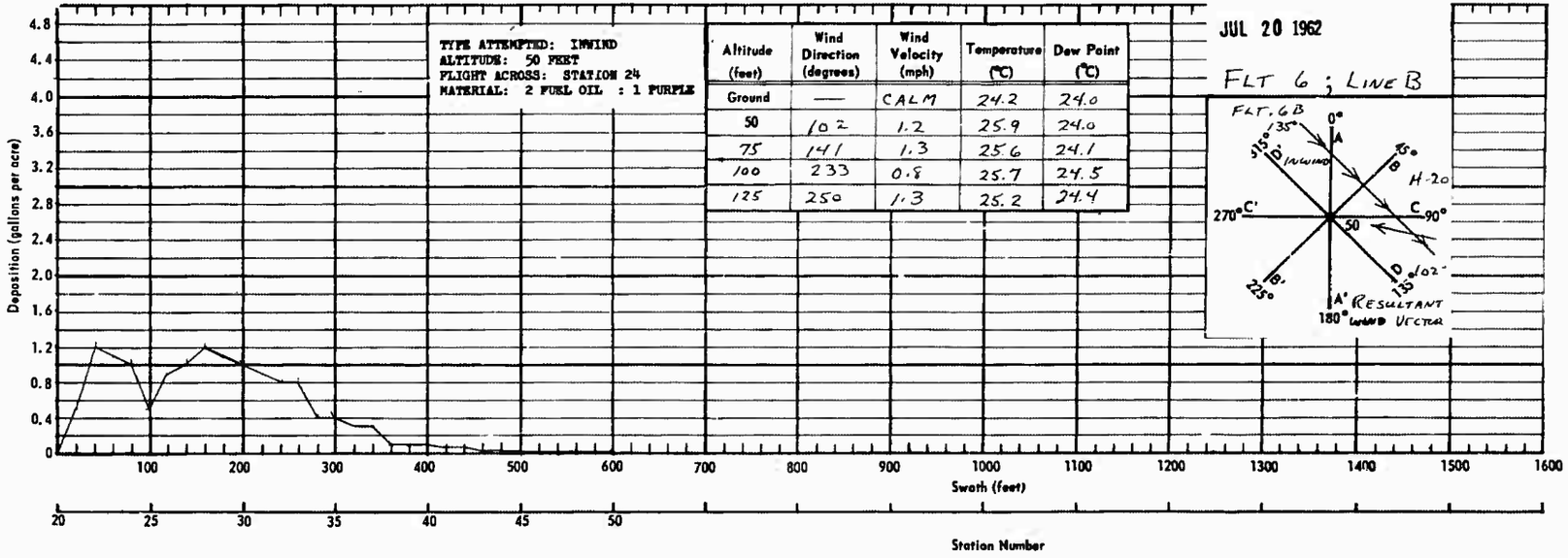
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	—	CALM	24.8	24.1
50	122	1.2	24.8	22.6
75	188	0.7	25.6	23.8
100	277	1.4	25.6	24.2
125	269	2.6	26.8	25.4



Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	—	CALM	24.2	24.0
50	102	1.2	25.9	24.0
75	141	1.3	25.6	24.1
100	233	0.8	25.7	24.5
125	250	1.3	25.2	24.4

JUL 20 1962

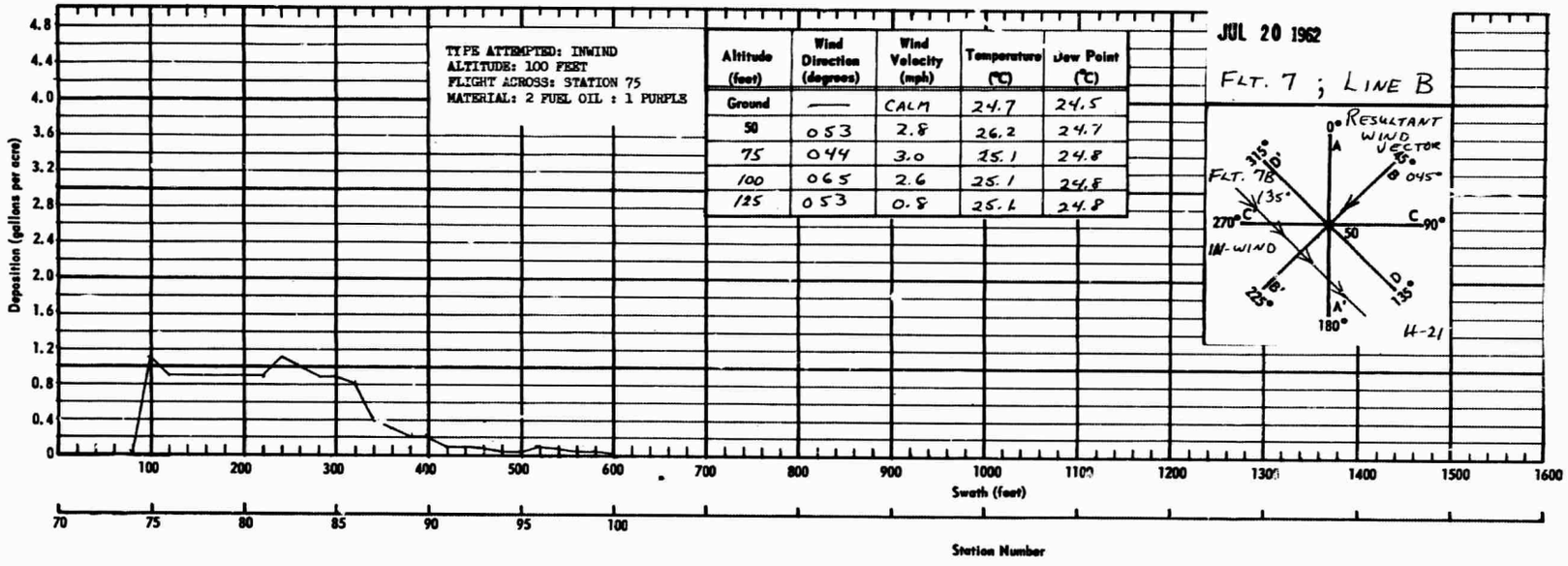
FLT. 5 ; LINE B

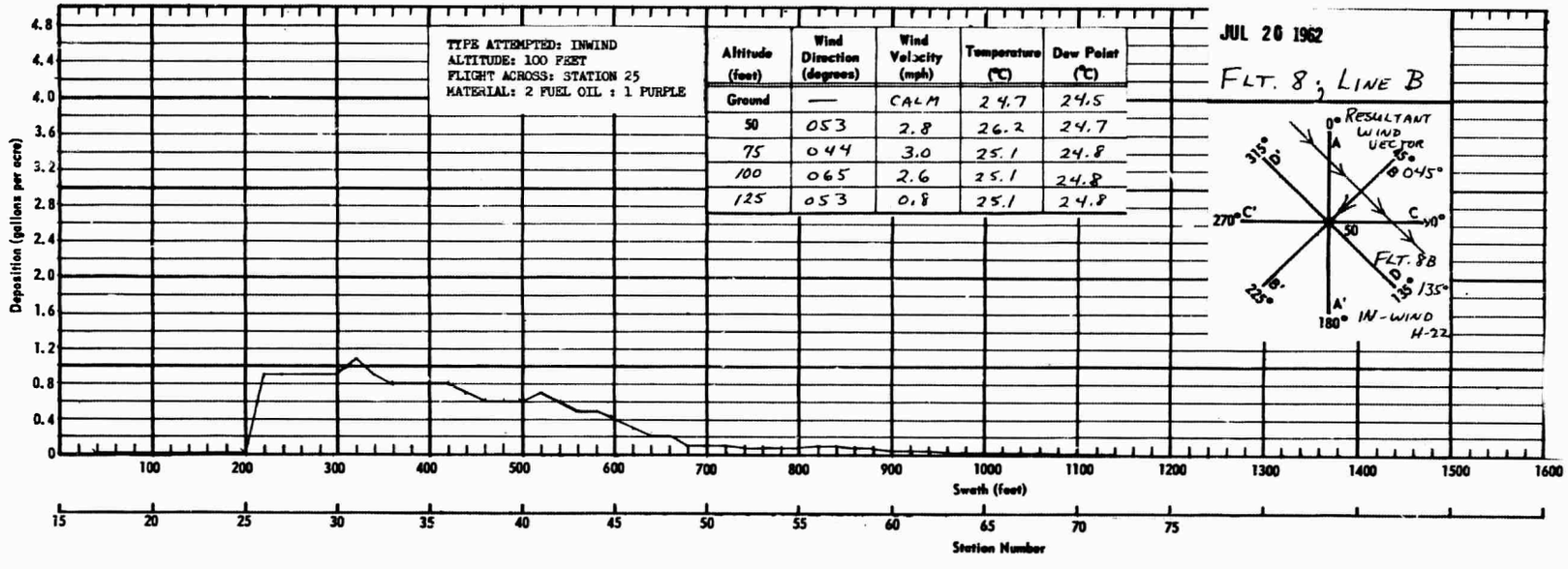


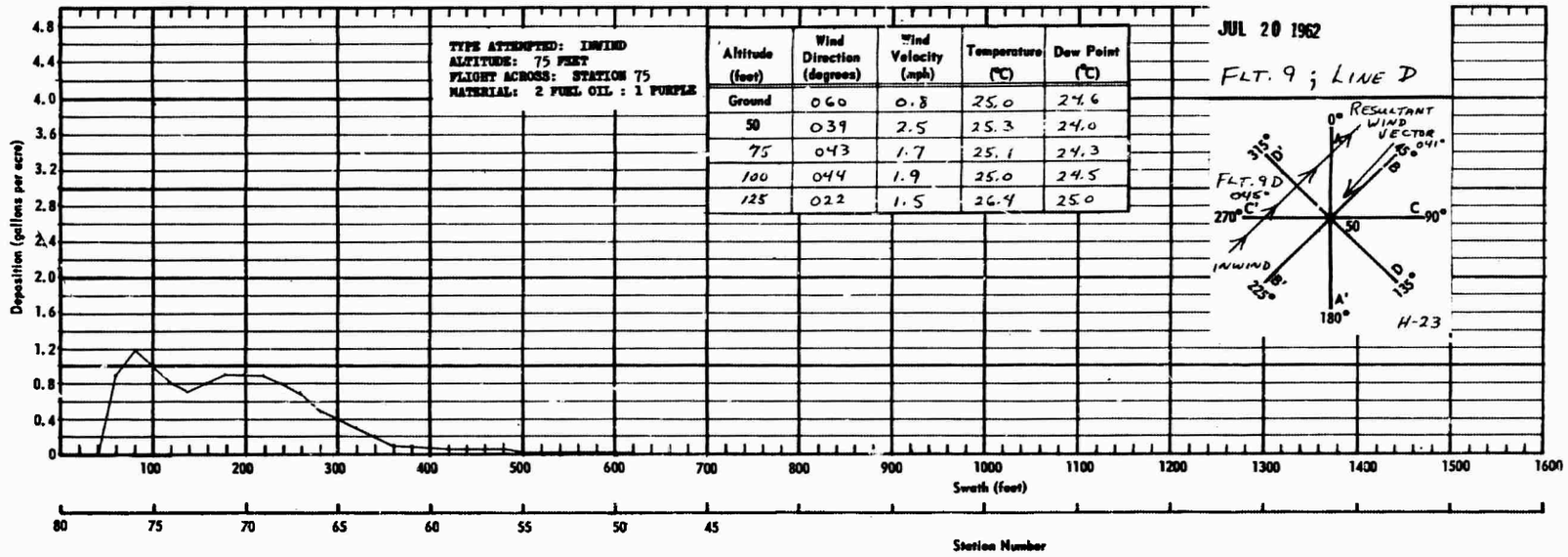
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	—	CALM	24.2	24.0
50	102	1.2	25.9	24.0
75	141	1.3	25.6	24.1
100	233	0.8	25.7	24.5
125	250	1.3	25.2	24.4

JUL 20 1962

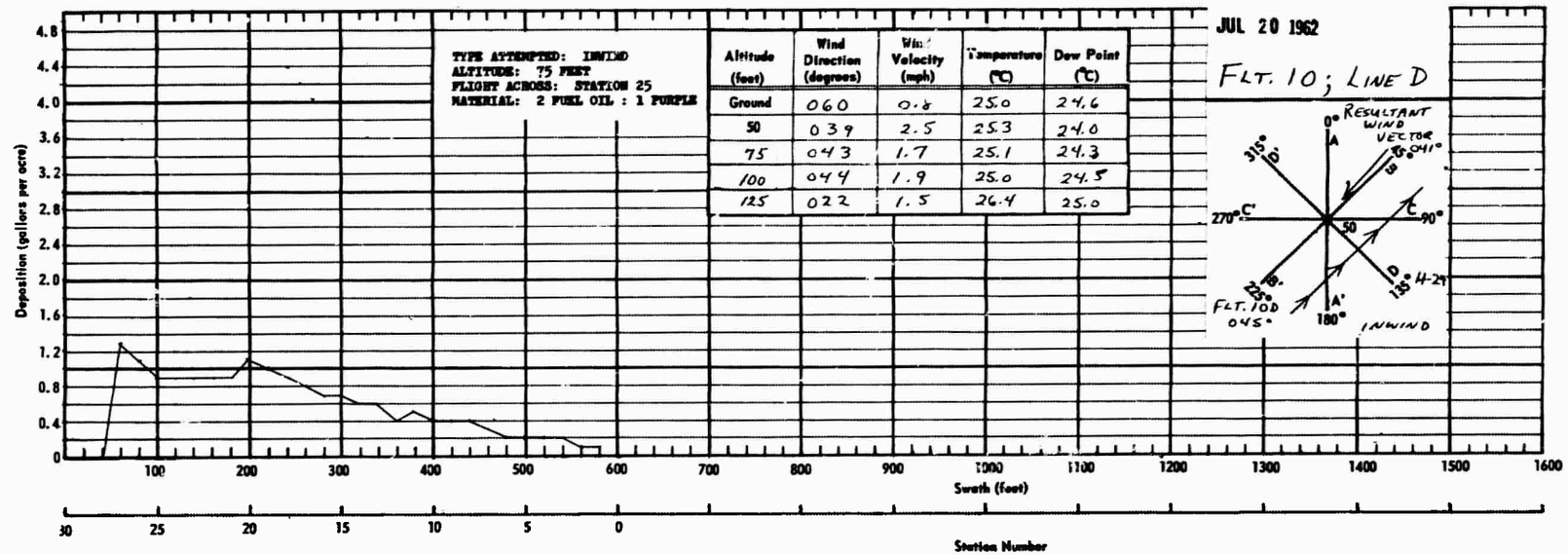
FLT 6 ; LINE B


TYPE ATTEMPTED: INWIND
ALTITUDE: 100 FEET
FLIGHT ACROSS: STATION 75
MATERIAL: 2 FUEL OIL : 1 PURPLE
Altitude (feet) | Wind Direction (degrees) | Wind Velocity (mph) | Temperature (°C) | Dew Point (°C)
Ground | — | CALM | 24.7 | 24.5
50 | 053 | 2.8 | 26.2 | 24.7
75 | 044 | 3.0 | 25.1 | 24.8
100 | 065 | 2.6 | 25.1 | 24.8
125 | 053 | 0.8 | 25.1 | 24.8
JUL 20 1962
FLT. 7 ; LINE B
RESULTANT WIND VECTOR
FLT. 7B
IN-WIND
H-21
Deposition (gallons per acre)
Swath (feet)
Station Number

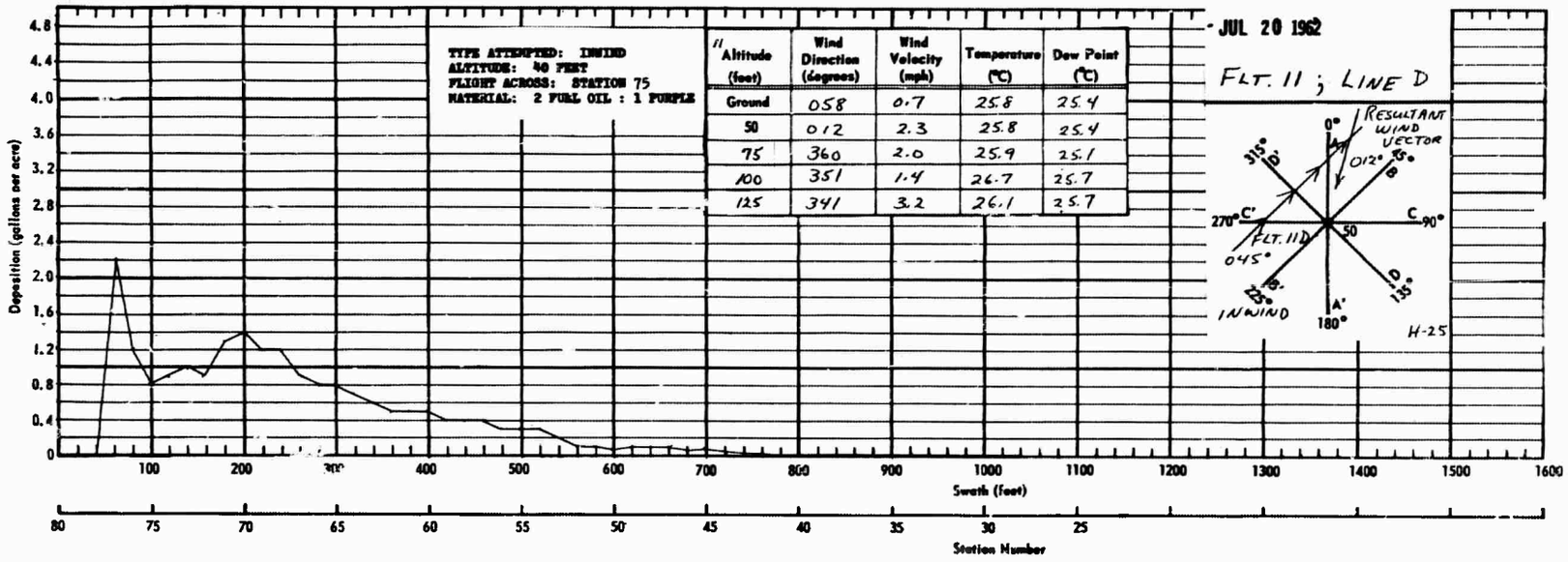

TYPE ATTEMPTED: INWIND
ALTITUDE: 100 FEET
FLIGHT ACROSS: STATION 25
MATERIAL: 2 FUEL OIL : 1 PURPLE
Altitude (feet) | Wind Direction (degrees) | Wind Velocity (mph) | Temperature (°C) | Dew Point (°C)
Ground | — | CALM | 24.7 | 24.5
50 | 053 | 2.8 | 26.2 | 24.7
75 | 044 | 3.0 | 25.1 | 24.8
100 | 065 | 2.6 | 25.1 | 24.8
125 | 053 | 0.8 | 25.1 | 24.8
JUL 20 1962
FLT. 8 ; LINE B
RESULTANT WIND VECTOR
FLT. 8B
IN-WIND
H-22
Deposition (gallons per acre)
Swath (feet)
Station Number



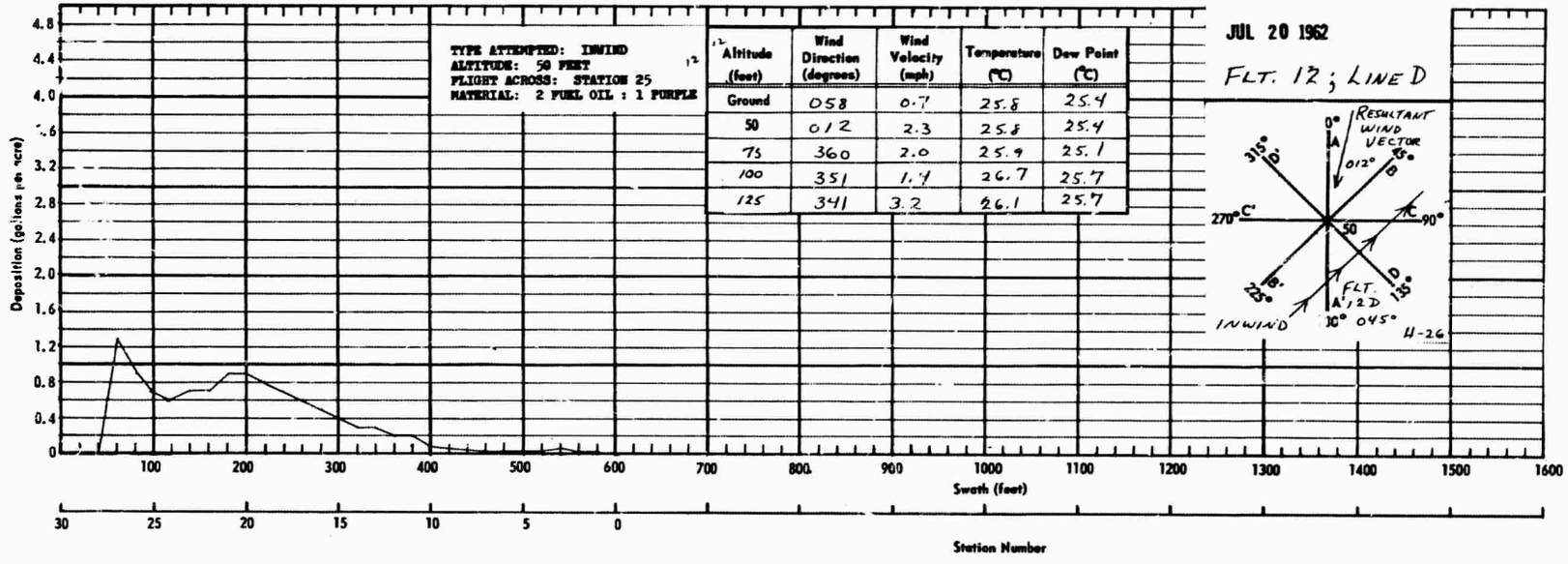
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	060	0.8	25.0	24.6
50	039	2.5	25.3	24.0
75	043	1.7	25.1	24.3
100	044	1.9	25.0	24.5
125	022	1.5	26.4	25.0



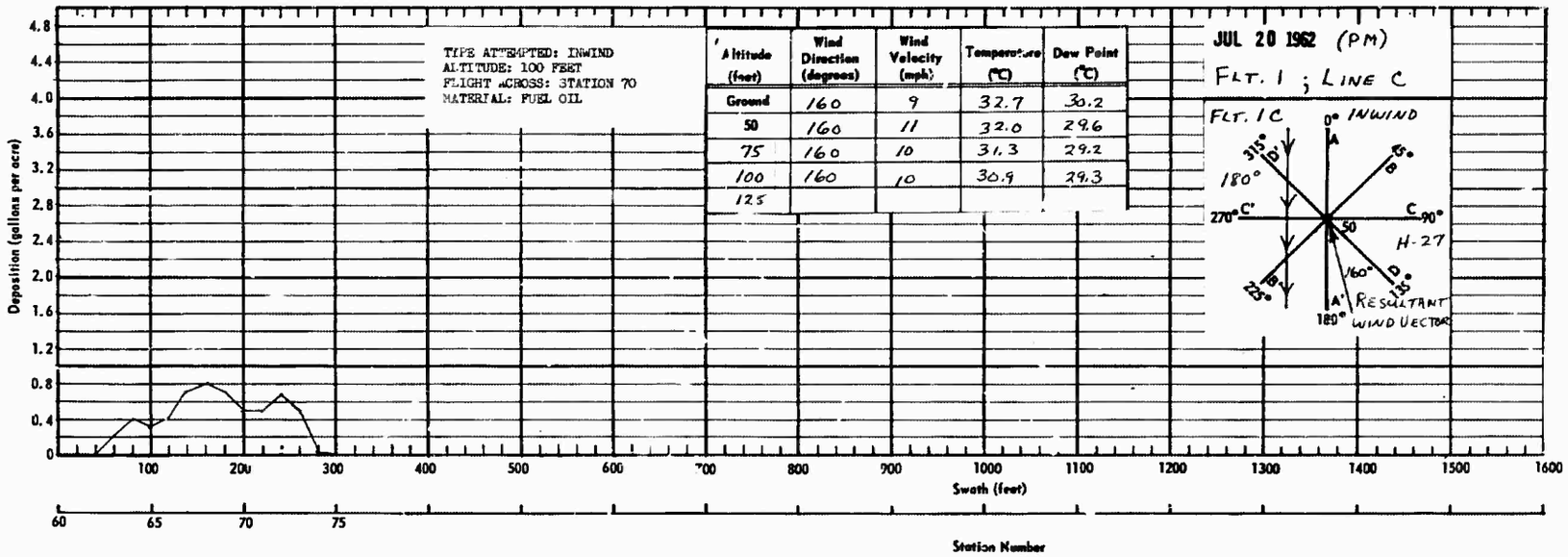
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	060	0.8	25.0	24.6
50	039	2.5	25.3	24.0
75	043	1.7	25.1	24.3
100	044	1.9	25.0	24.5
125	022	1.5	26.4	25.0



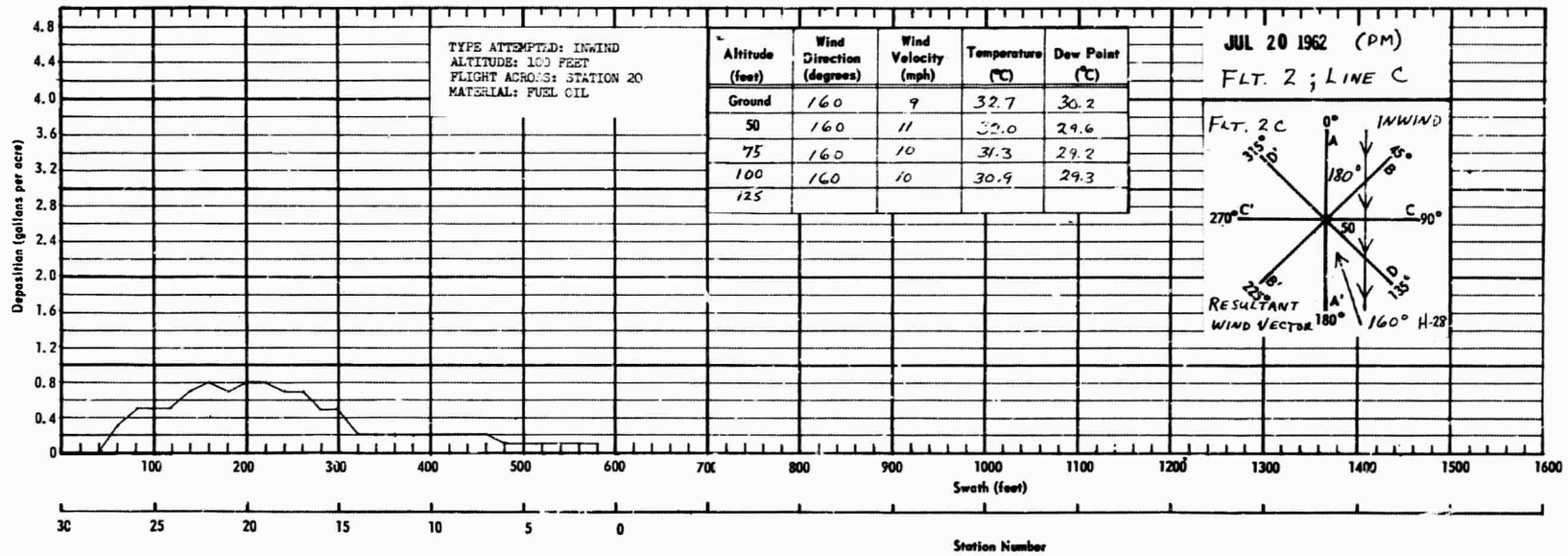
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	058	0.7	25.8	25.4
50	012	2.3	25.8	25.4
75	360	2.0	25.9	25.1
100	351	1.4	26.7	25.7
125	341	3.2	26.1	25.7



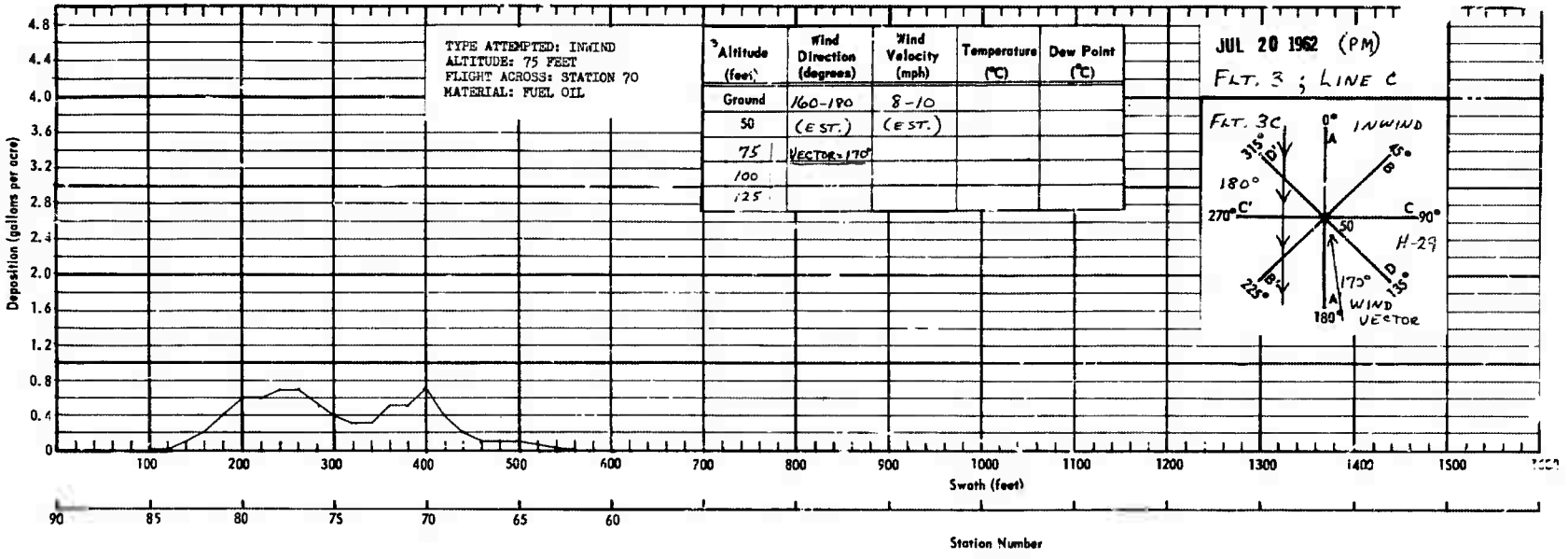
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	058	0.7	25.8	25.4
50	012	2.3	25.8	25.4
75	360	2.0	25.9	25.1
100	351	1.4	26.7	25.7
125	341	3.2	26.1	25.7



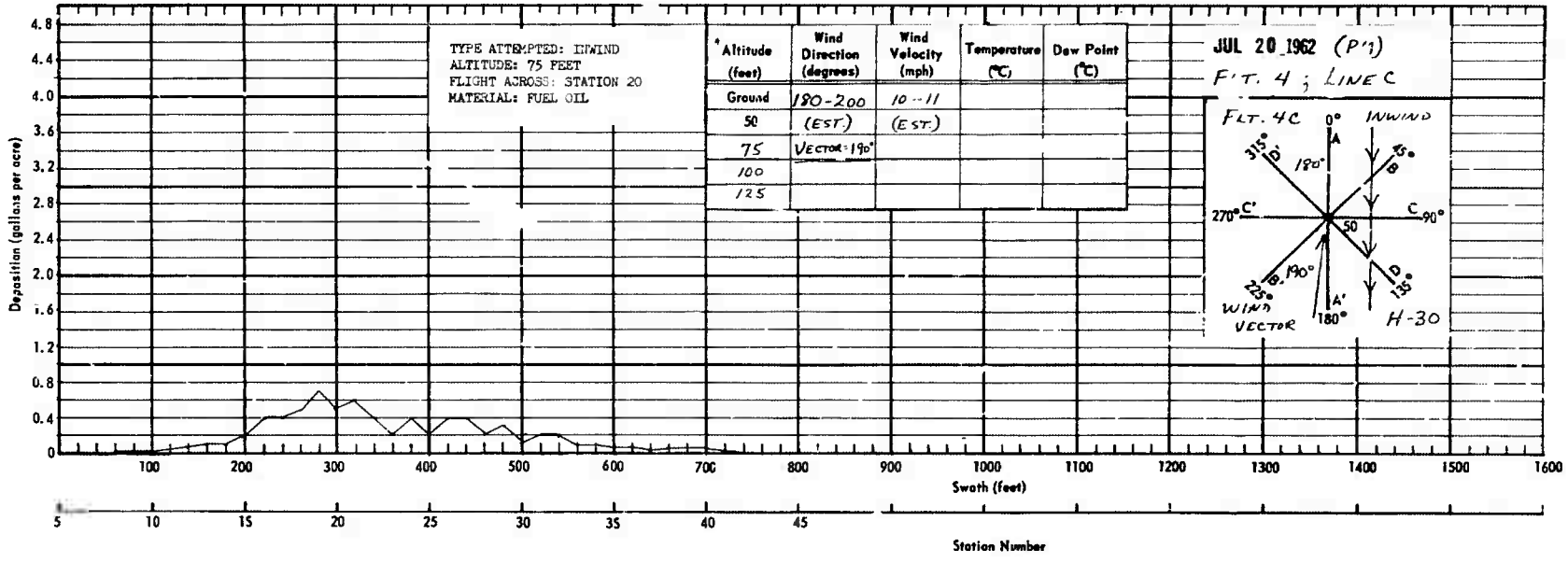
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	160	9	32.7	30.2
50	160	11	32.0	29.6
75	160	10	31.3	29.2
100	160	10	30.9	29.3
125				



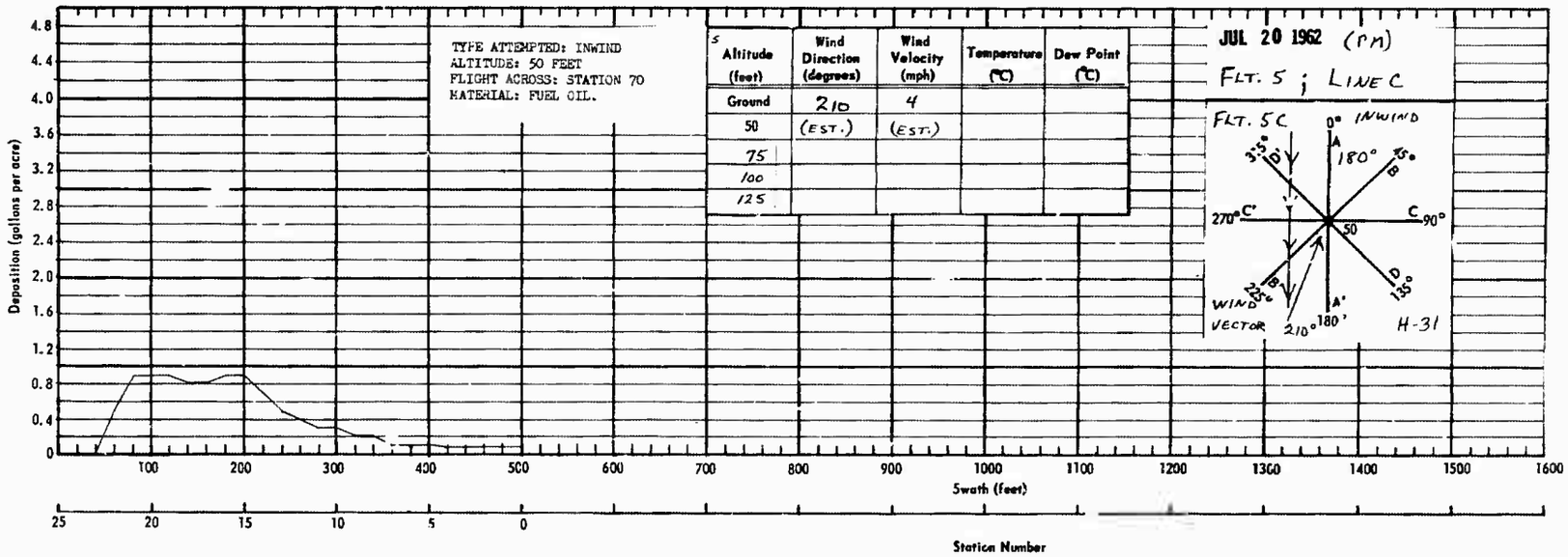
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	160	9	32.7	30.2
50	160	11	32.0	29.6
75	160	10	31.3	29.2
100	160	10	30.9	29.3
125				

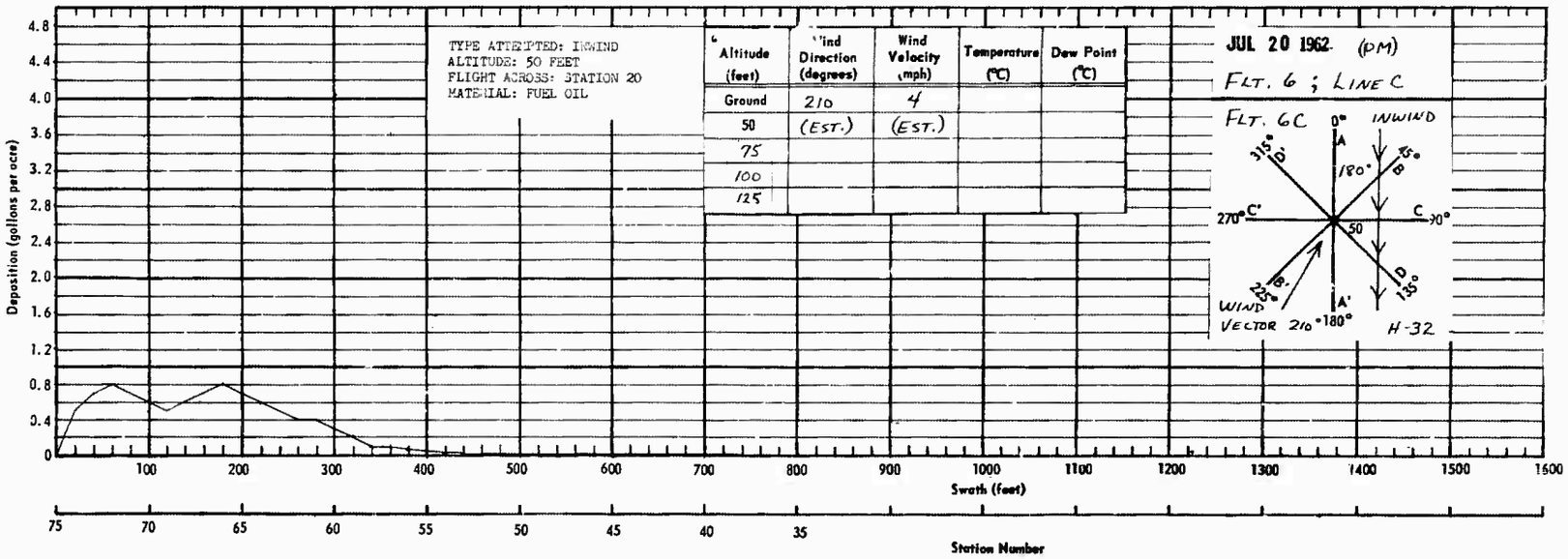


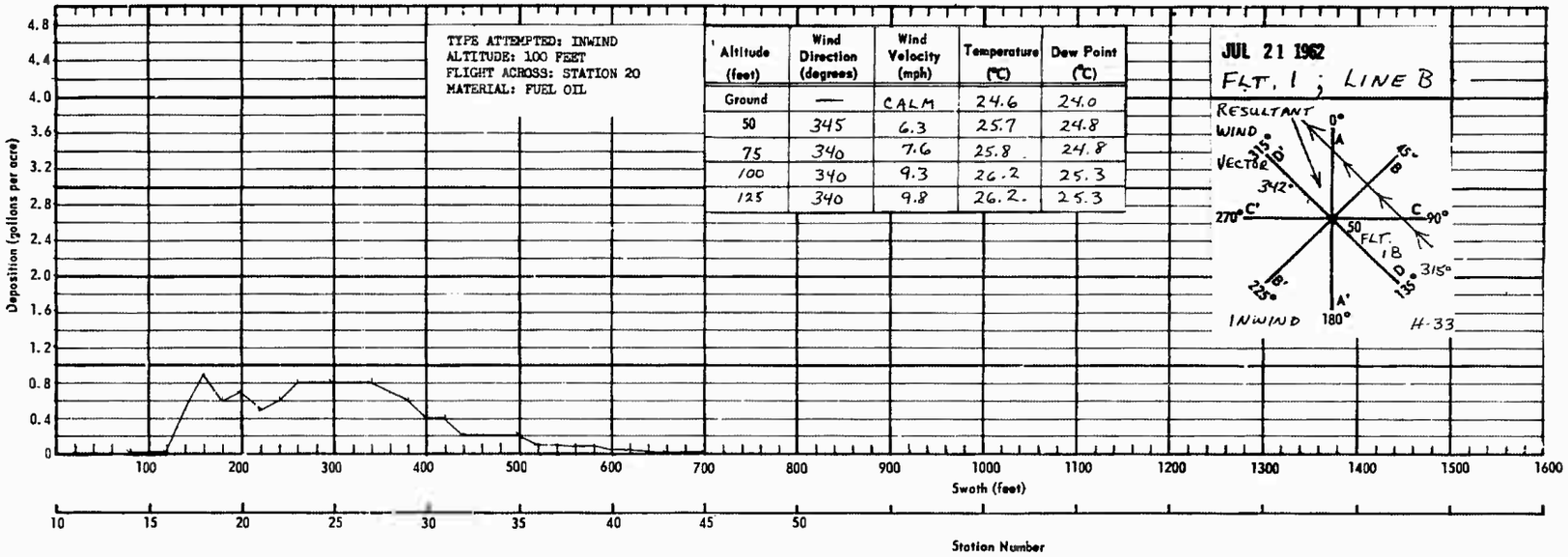
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	160-180	8-10		
50	(EST.)	(EST.)		
75	VECTOR=170°			
100				
125				



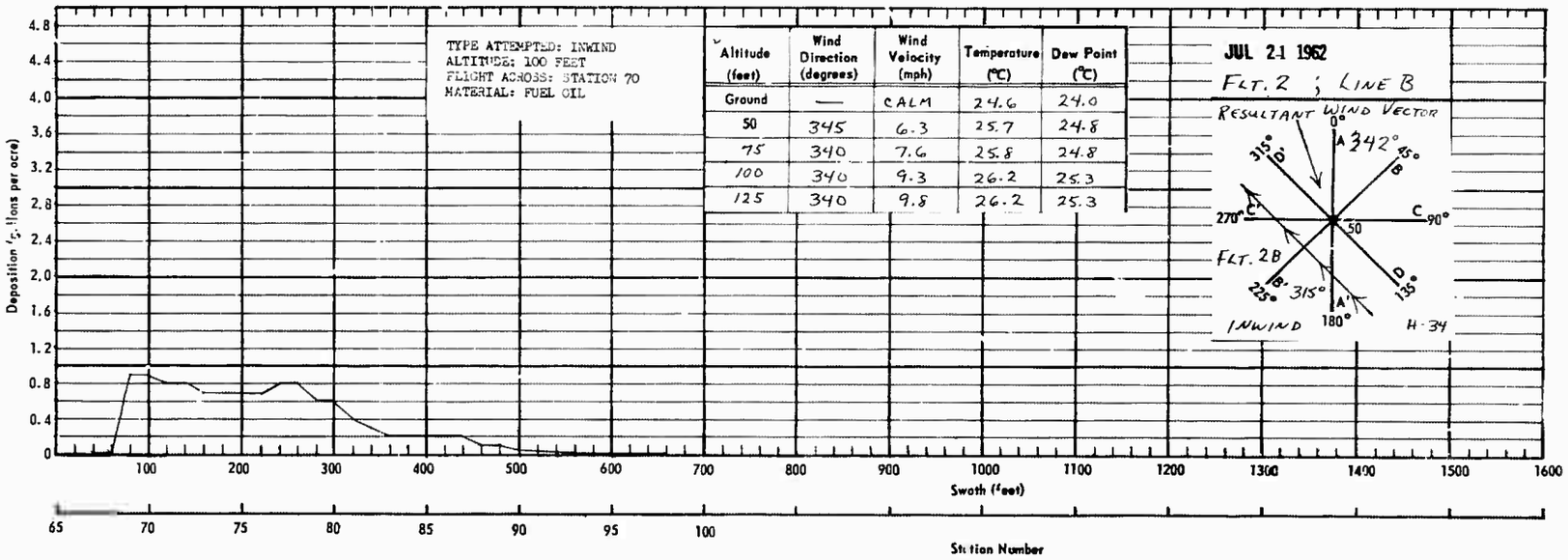
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	180-200	10-11		
50	(EST.)	(EST.)		
75	VECTOR=190°			
100				
125				


TYPE ATTEMPTED: INWIND
ALTITUDE: 50 FEET
FLIGHT ACROSS: STATION 70
MATERIAL: FUEL OIL.
Altitude (feet)
Wind Direction (degrees)
Wind Velocity (mph)
Temperature (°C)
Dew Point (°C)
Ground 210 4
50 (EST.) (EST.)
75
100
125
JUL 20 1962 (PM)
FLT. 5 ; LINE C
FLT. 5C
INWIND
WIND VECTOR
H-31
Deposition (gallons per acre)
Swath (feet)
Station Number

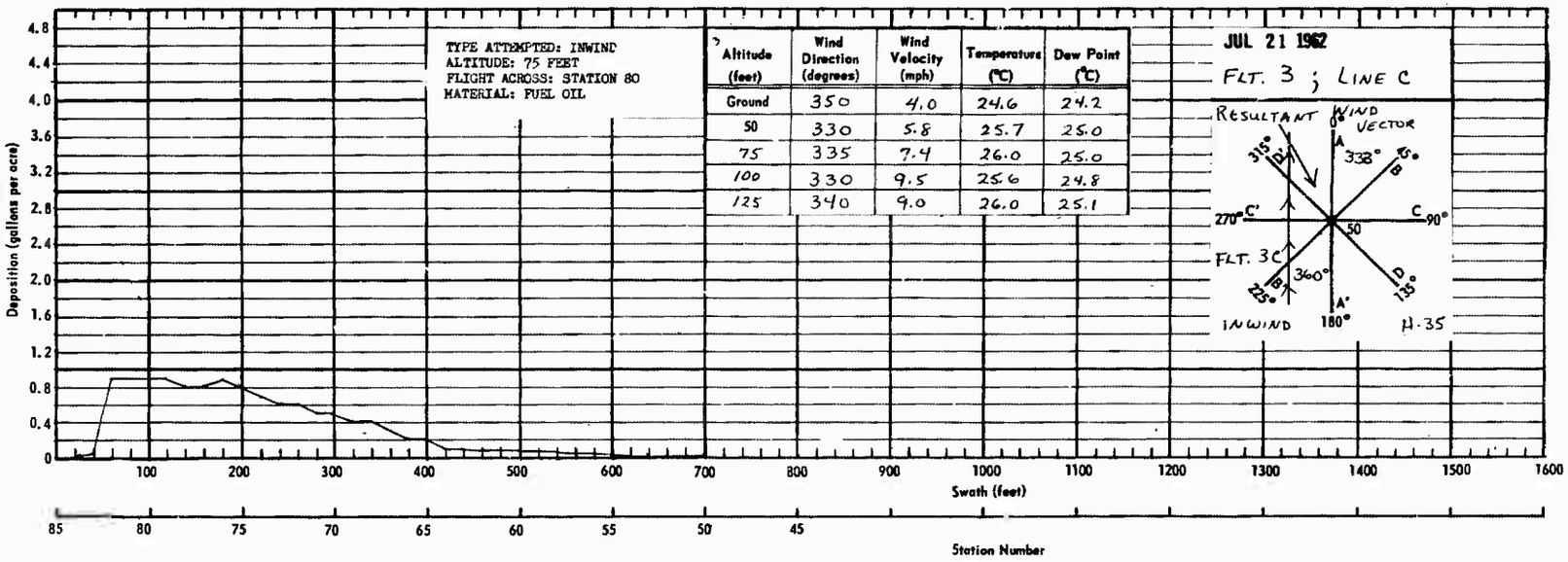

TYPE ATTEMPTED: INWIND
ALTITUDE: 50 FEET
FLIGHT ACROSS: STATION 20
MATERIAL: FUEL OIL
Altitude (feet)
Wind Direction (degrees)
Wind Velocity (mph)
Temperature (°C)
Dew Point (°C)
Ground 210 4
50 (EST.) (EST.)
75
100
125
JUL 20 1962 (PM)
FLT. 6 ; LINE C
FLT. 6C
INWIND
WIND VECTOR
H-32
Deposition (gallons per acre)
Swath (feet)
Station Number



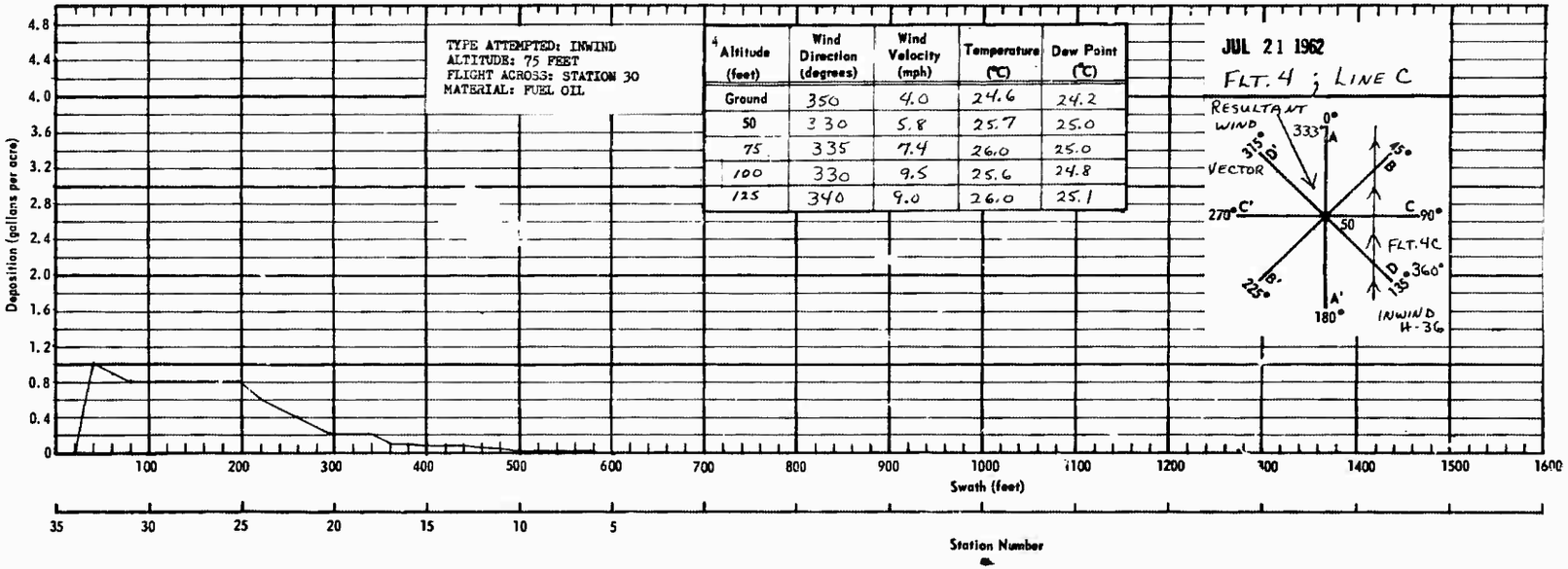
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	—	CALM	24.6	24.0
50	345	6.3	25.7	24.8
75	340	7.6	25.8	24.8
100	340	9.3	26.2	25.3
125	340	9.8	26.2	25.3



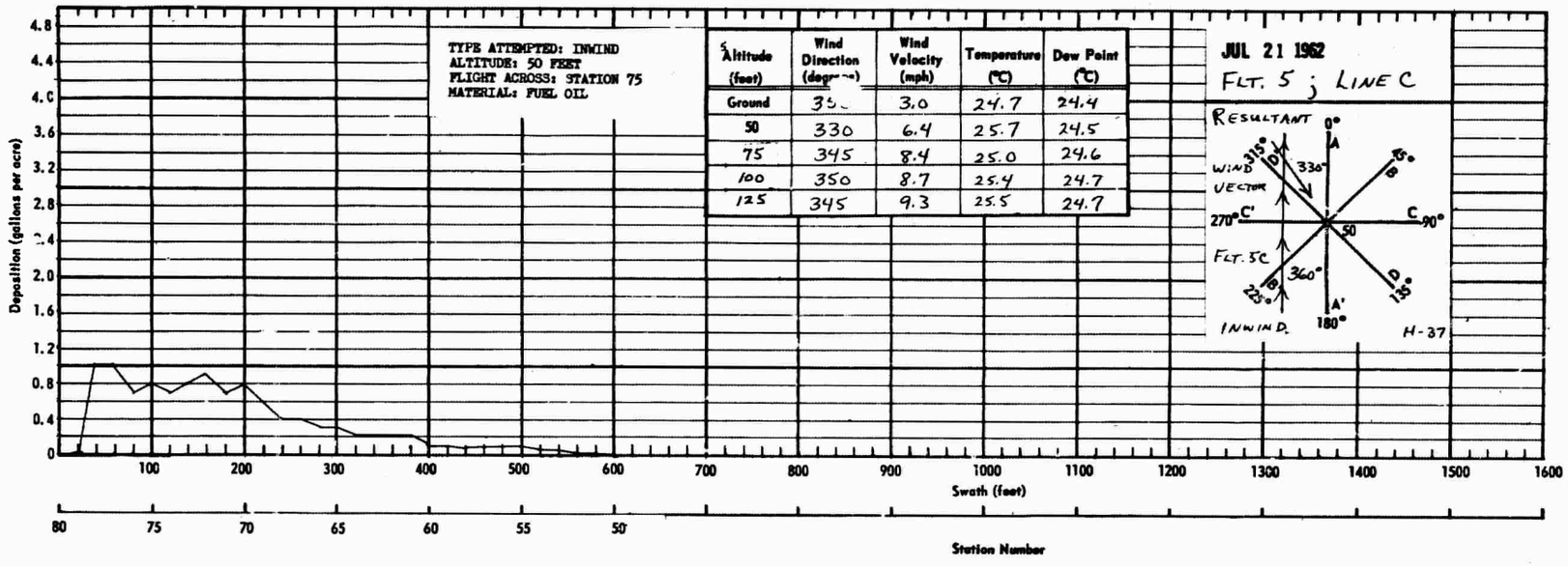
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	—	CALM	24.6	24.0
50	345	6.3	25.7	24.8
75	340	7.6	25.8	24.8
100	340	9.3	26.2	25.3
125	340	9.8	26.2	25.3



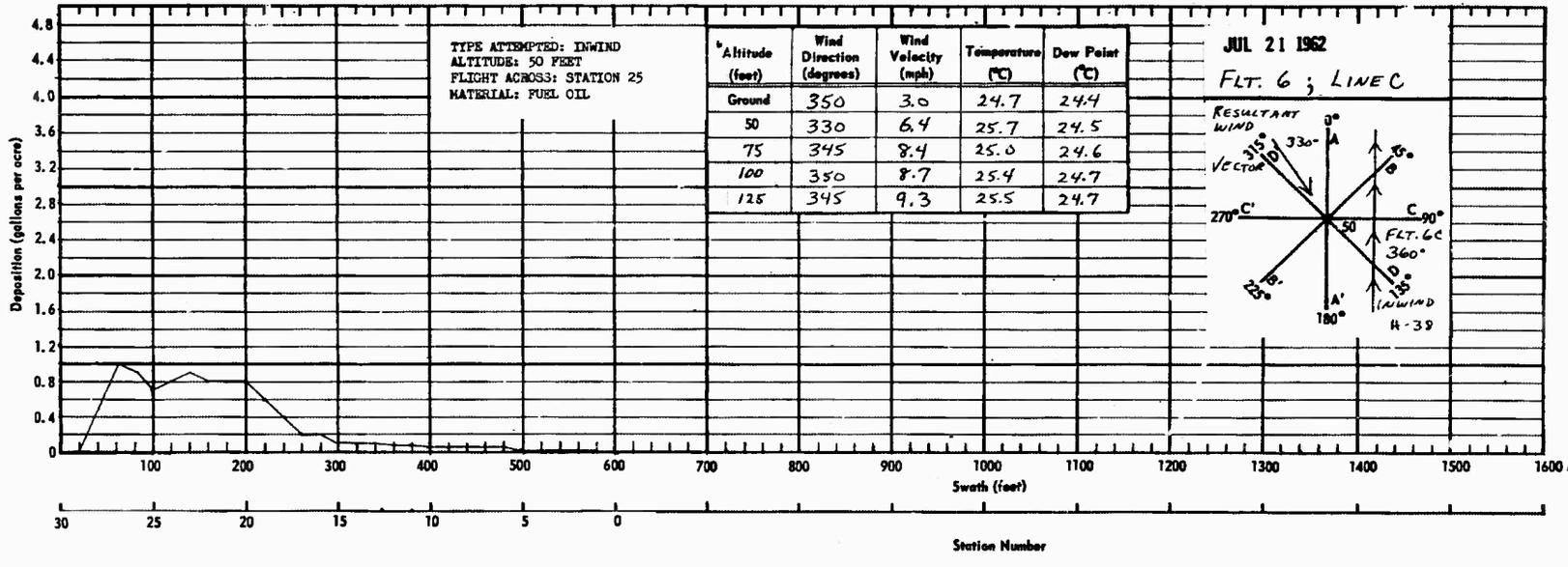
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	350	4.0	24.6	24.2
50	330	5.8	25.7	25.0
75	335	7.4	26.0	25.0
100	330	9.5	25.6	24.8
125	340	9.0	26.0	25.1



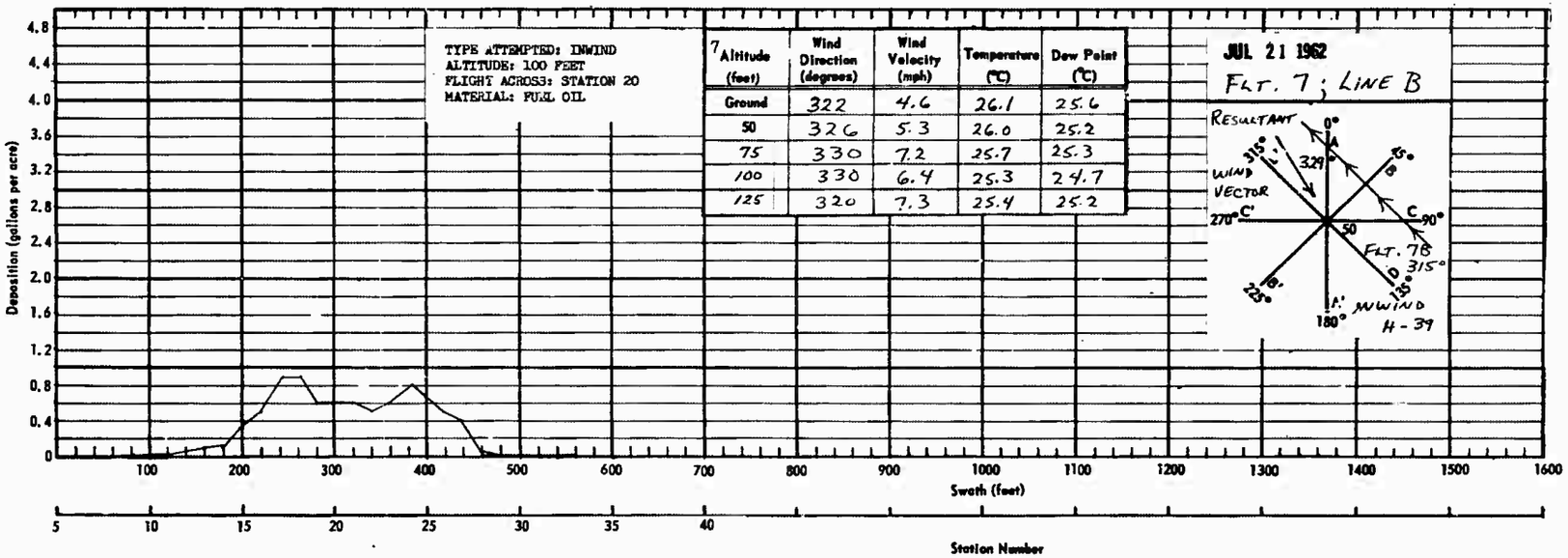
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	350	4.0	24.6	24.2
50	330	5.8	25.7	25.0
75	335	7.4	26.0	25.0
100	330	9.5	25.6	24.8
125	340	9.0	26.0	25.1



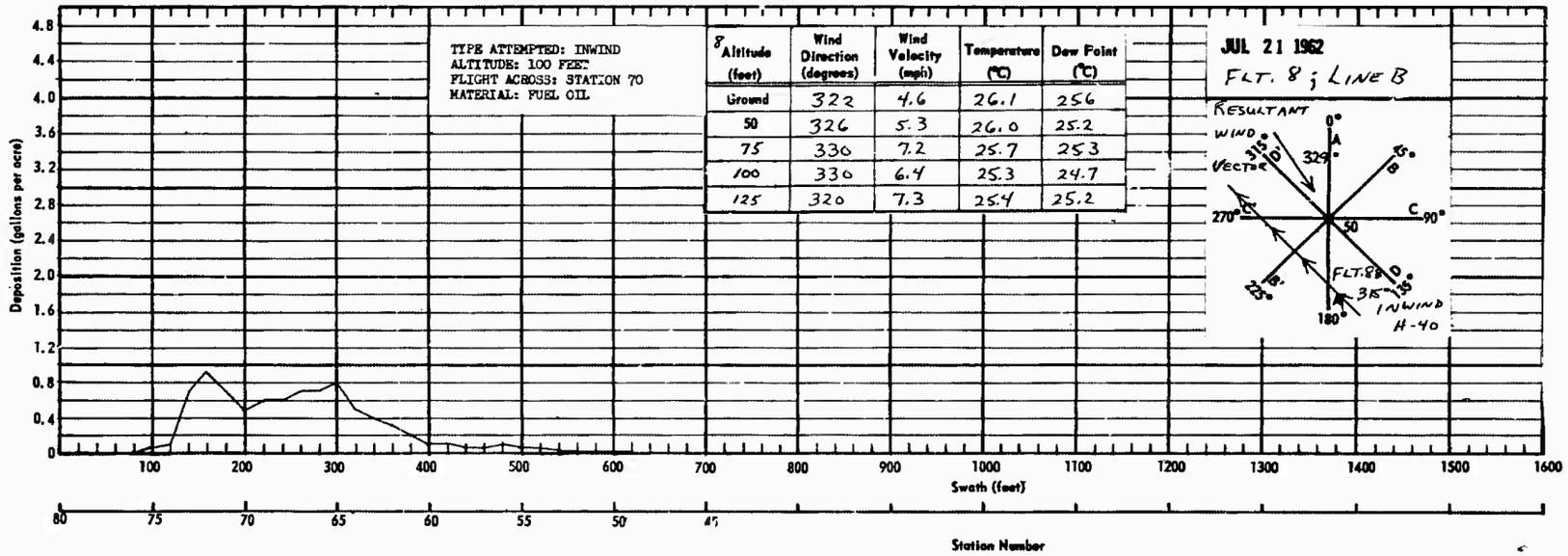
Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	35_	3.0	24.7	24.4
50	330	6.4	25.7	24.5
75	345	8.4	25.0	24.6
100	350	8.7	25.4	24.7
125	345	9.3	25.5	24.7



Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	350	3.0	24.7	24.4
50	330	6.4	25.7	24.5
75	345	8.4	25.0	24.6
100	350	8.7	25.4	24.7
125	345	9.3	25.5	24.7



7 Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	322	4.6	26.1	25.6
50	326	5.3	26.0	25.2
75	330	7.2	25.7	25.3
100	330	6.4	25.3	24.7
125	320	7.3	25.4	25.2



8 Altitude (feet)	Wind Direction (degrees)	Wind Velocity (mph)	Temperature (°C)	Dew Point (°C)
Ground	322	4.6	26.1	256
50	326	5.3	26.0	25.2
75	330	7.2	25.7	253
100	330	6.4	25.3	24.7
125	320	7.3	25.4	25.2

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2a. REPORT SECURITY CLASSIFICATION
Unclassified

2b. GROUP
Not applicable

3. REPORT TITLE
Spray Test Calibration of the HIDAL (HUS-1 or H-34)

4. DESCRIPTIVE NOTES *(Type of report and inclusive dates)*

5. AUTHOR(S) *(Last name, first name, initial)*
Brown, James W.

6. REPORT DATE	7a. TOTAL NO. OF PAGES	7b. NO. OF REFS
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8a. CONTRACT OR GRANT NO.	9a. ORIGINATOR'S REPORT NUMBER(S)
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13. ABSTRACT

This report contains the results of studies undertaken to calibrate the HIDAL (Helicopter, Insecticide, Dispersal Apparatus, Liquid) dispersal unit for use on rotor wing type aircraft. Five supporting appendices are included.

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